The IRON AGE
February 4, 1960 A Chilton Publication The National Metalworking Weekly

• A Special Report On

THE OUTLOOK FOR INDUSTRIAL PRICES

• Basic Materials

• Machinery and Equipment

• Parts and Components

QUESTION: Will Higher Prices Hurt Volume? — P. 47

Import Threat Hits More Steel Products — P. 52

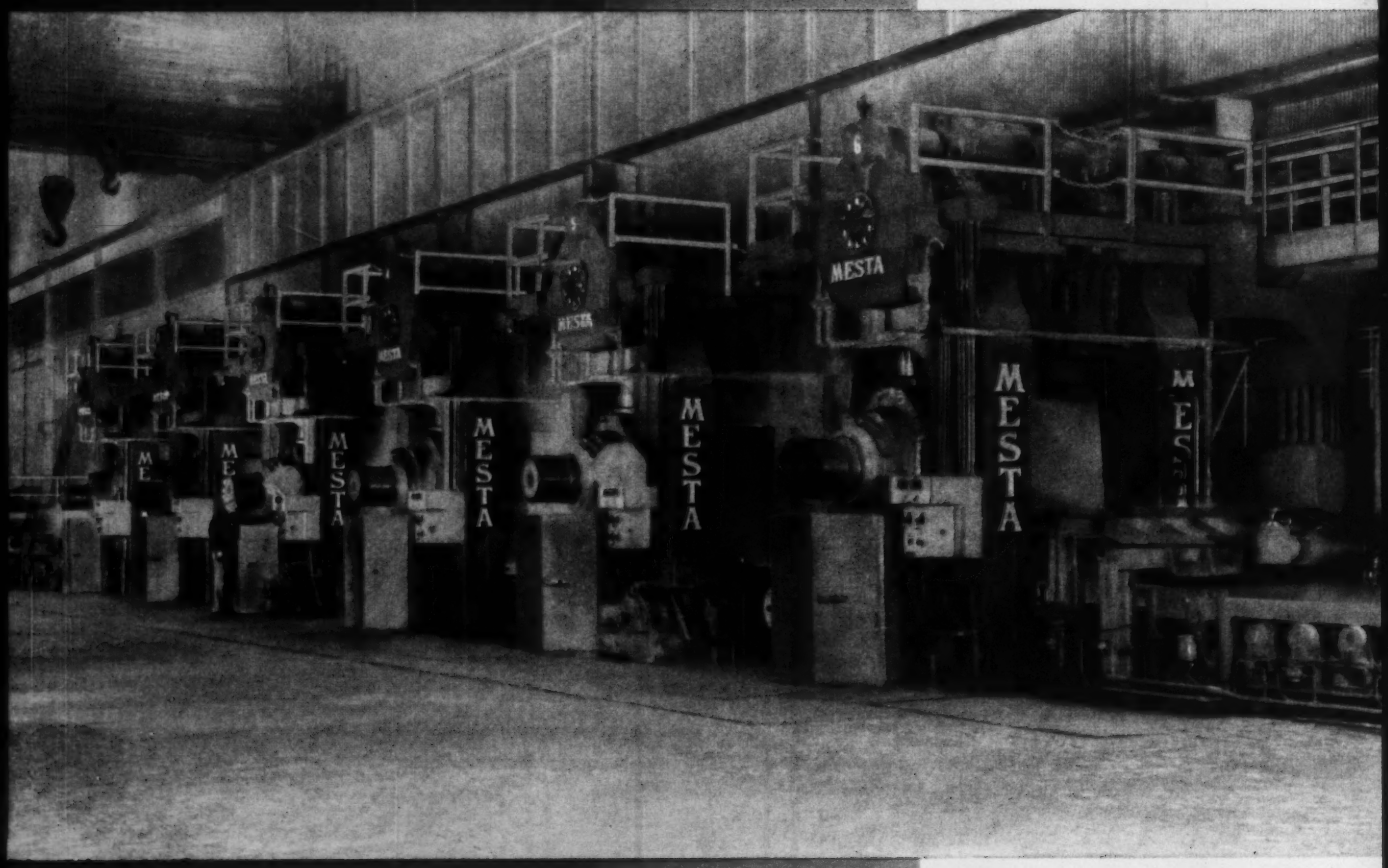
Explosive Hardening — P. 85

Digest of the Week — P. 2-3

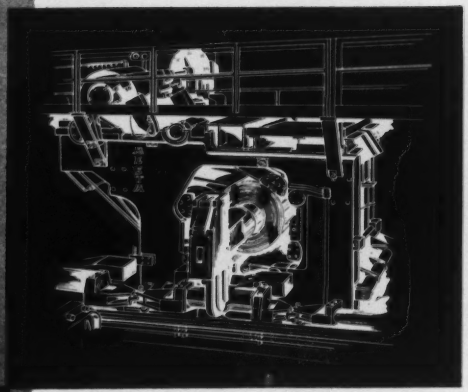
HOT STRIP MILLS

DESIGNED AND BUILT BY

MESTA



Six Finishing Stands with Three Vertical Edgers on the MESTA 44" Four High Hot Strip Mill at Jones & Laughlin Steel Corporation, Aliquippa Works



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PITTSBURGH, PENNSYLVANIA

Bridge over Appomattox River between Colonial Heights and Petersburg.

Dual bridge over Jackson River, near Covington, Va.

Girders fabricated from steel plate for Virginia highway bridges

Four-lane turnpike over Atlantic Coast Line's tracks in Dinwiddie County.

These three new bridges on the Richmond-Petersburg Turnpike in Virginia illustrate the important part steel plate plays in modern highway building. For strength, long-life, and economy, plate-girder construction is ideal for spans over rivers, railroads, and highways.

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The IRON AGE

February 4, 1960—Vol. 185, No. 5

Digest of the Week in

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Do They Help?—Carnegie Tech has a business games program lined up which it feels will be better and more helpful than any previous attempts by others. Here's why. P. 49

FOUNDRY SPENDING

Modernization and Expansion—In the next two years founders will spend more than $6.5 billion on

supplies, materials and services. Modernizing will be a major item, capacity will be increased. P. 50

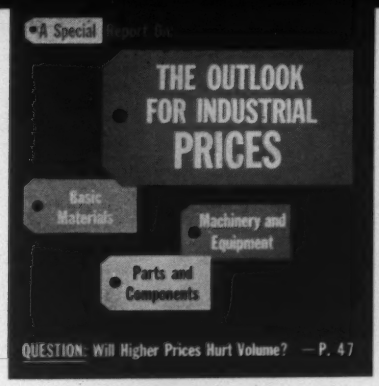
MORE IMPORTS

Squeeze Pipe Producers—Domestic pipe mills seek ways to cope with the growing threat from foreign steel producers. Buttweld pipe is particularly vulnerable. It faces the same problems that cost U. S. its barbwire markets. P. 52

CONVEYORS

More Uses—Overhead conveyors can be used for more than moving.

Metalworking


A Special
THE OUTLOOK FOR INDUSTRIAL PRICES
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Machinery and Equipment
Parts and Components
QUESTION: Will Higher Prices Hurt Volume? — P. 47

◀ COVER FEATURE

PRICE TRENDS: Industrial prices are in a critical phase this year. Upward pressures are strong, but so are pressures to hold the line. This week's special report analyzes the situation, tells how forecasters see price trends. P. 47

They can be integrated into production lines. P. 53

IRON ORE

Foreign Inroads—Lake Superior ore is fighting for life. Foreign imports have hurt considerably. Oremen say foreign ores are getting the breaks and are finding more markets. P. 55

FEATURE ARTICLES

EXPLOSIVE HARDENING

On Manganese Steels—Here's an explosive technique that hardens Hadfield manganese steels in a fraction of a second. An improvement over existing hammering or pressing methods, the newer technique treats irregular surfaces; spots flaws in castings; and results in less workpiece deformation. P. 85

SPOT HONEYCOMB FLAWS

From Spray and Heat—A major drawback in the use of honeycomb panel is the lack of a complete test to check the brazed joints. A new process requires only spraying and heating to show up any flaws. It's a thermographic test system that detects lack of braze, excessive braze and deformed core. P. 90

NITRIDING PROPERTIES

From 4140 Steel—Special nitriding steels are not always available in all sizes; and they are expensive. Recent data show that a one-cycle nitriding process often allows the use of such low-cost low-alloy grades as AISI 4140 in place of the special steels. P. 92

BIG MACHINING SETUP

Optimum Efficiency—A flexible palletized transfer machine handles power - steering pump housings through 220 operations. Once housings are mounted on pairs on the pallets, parts are finished at the rate of 300 per hour. And at 100-pct efficiency, too. P. 96

TUBULAR RIVETING

Gaining Favor—Industry is beginning to look once again at modern-day riveting to speed assembly work. The process lends itself to automated assembly lines; and it's economical, too. High-speed machines now feed and set tubular and semi-tubular rivets. P. 98

MARKETS & PRICES

WEST COAST

Planemakers Diversify — Farwest aircraft companies have found a way to avoid the industry's ups and downs. They are going into other types of business, forming ties with foreign companies. P. 69

R&D PAYS

For Small Companies — Many small and medium size companies think only big companies can afford research and development programs. But more and more smaller companies are finding that they must go in for R&D if they are to avoid becoming static. P. 71

STEEL SUMMARY

New Spending Programs—Drive to cut costs is forcing steelmakers to near-record capital spending. Trend to computer controls of a wide range of operations is apparent in new programs of the industry P. 129

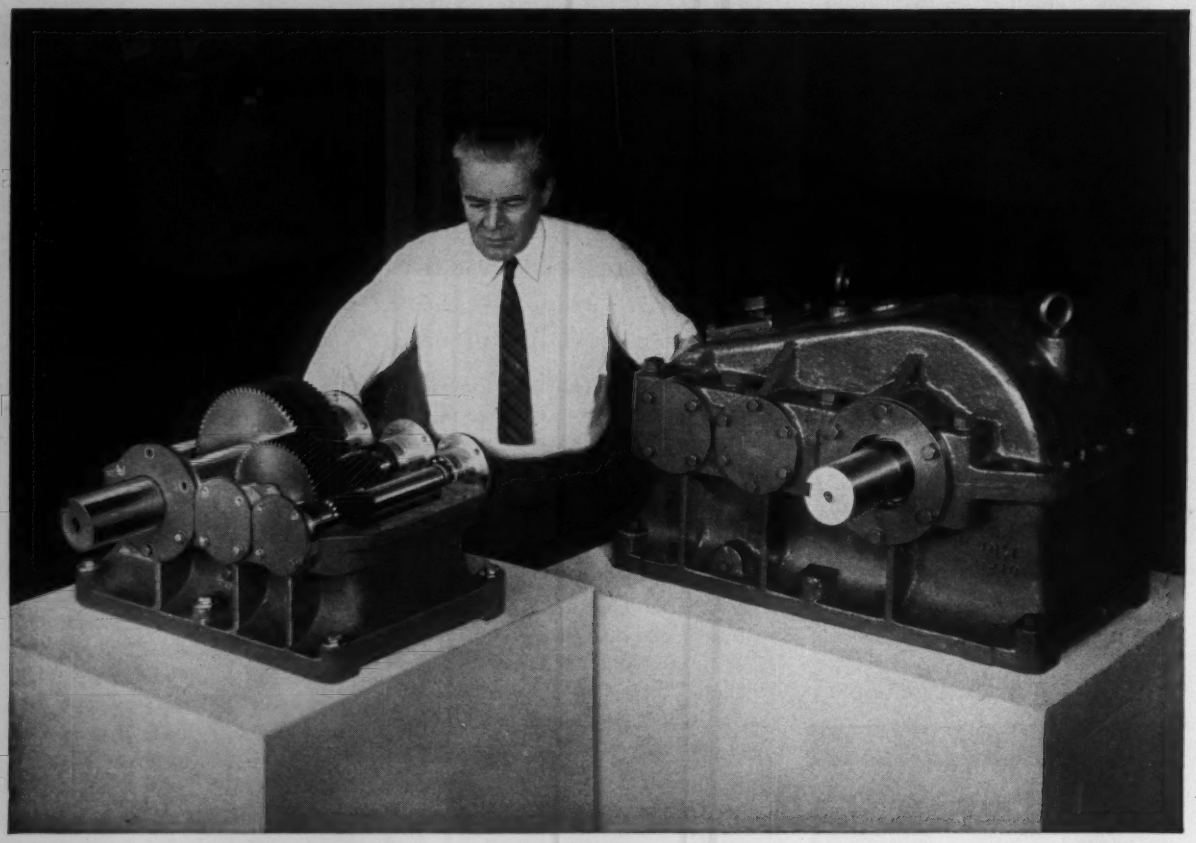
PURCHASING

Greater Interest—Industry is taking a greater interest in maintenance to cut rising costs. Maintenance equipment makers see a good future ahead. P. 130

NEXT WEEK

CHROMIUM DIFFUSION

A Practical Process — Next week's technical feature describes a new process that diffuses chromium into the base metal. Called Alphatizing, it creates a metallurgical alloy, not a coating. The method fits into production lines.



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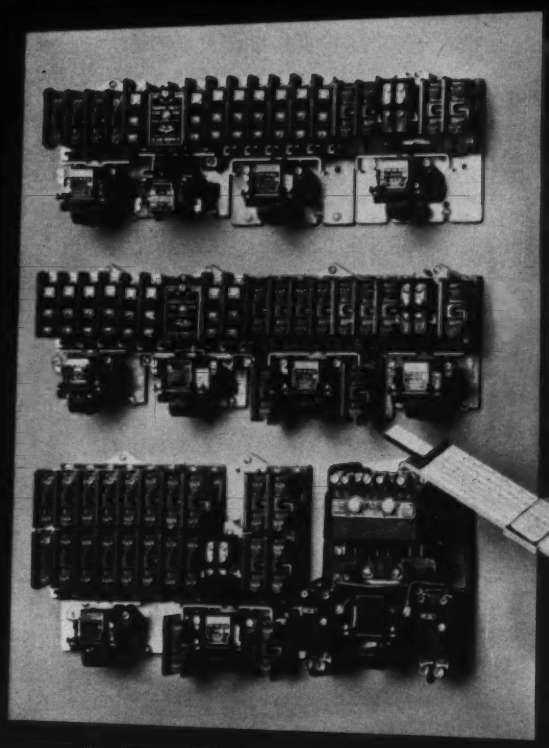
WHY SPACE IS
FRONT-PAGE NEWS...



Compact Clark Relays control 72 circuits from panel area smaller than a newspaper

In this day of space exploration and space economy, it's news—front page news—when you can get 72 separate, controlled circuits all on a panel no larger than 15" x 20".

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SHARON *Quality* **STEEL** SHARONSTEEL

The Next Steel Pact: Will It Be So Painful?

The steel industry failed to get a non-inflationary agreement. Its costs will be higher than any productivity gains. The excess cost will come from earnings unless there is some price relief. We think there has to be some.

Some day, steel management and labor must settle the question of a non-inflationary pact. How they are going to do it isn't clear yet. But the security of the industry and the worker depends on a new look at labor relations in steel.

Facts now prove that steel negotiators tried to do too much in too short a time. But the stand they took at least told the steel union what it is in for in the years ahead.

It ought to be clear to union leadership in steel that the industry will again hit hard in the next negotiating period to try and get what it failed to get this time. Put simply, the industry wants a labor pact that will enable it to make reasonable profits without inordinate or labor cost pass-along price increases.

The smaller and some medium-sized steel firms have been hit hard by the latest pact. They can't stand too many more if they want to stay in business. For them to get price relief does not make matters any better. Steel companies can no longer afford to raise prices as they have in the past.

That means there has to be a stiffer front to union demands for raises that are in excess of what can be made up with machinery, and union-management cooperation.

Here is where the government comes in. As long as there is industry-wide bargaining with union ability to shut down a basic industry, government will interfere. The latest settlement proves this beyond all reasonable doubt. It is also clear that, so far, the union usually gains when government interferes.

But how long can the union depend on government? Sooner or later, the current union pact will call for higher steel prices. The next demand will be resisted far more strenuously than this one was. If the government again comes to the aid of the union to help it to get something it can't get itself, the strait jacket will be tried on for size.

The next steel pact will be painful for everyone if it is a repeat performance. Steel companies will not give up what little progress they have made towards non-inflationary pacts.

They will fight harder the next time!

Tom Campbell

Editor-in-Chief

NEW PRODUCTS

N/D's new integrally sealed, heavy-duty conveyor ball bearing shuts out moist and dry abrasive contaminants . . . reduces assembly time and eliminates costly relubrication maintenance.

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Weld Light Gage Metal

Development of a weld metal for welding light gage, high strength structural steel to withstand dynamic loading at low temperatures is discussed in a report for the U. S. Navy. Stress-relieved weld metal, deposited by special electrodes, yields uniform energy values. These values equal those of the base metal, in all zones across the weld joint. A proposed specification for the electrodes appears in the report.

Better Titanium Castings

Production processes for titanium alloy castings of aircraft quality include vacuum consumable electrode skull melting with vacuum pouring. This gives sound castings with as-cast mechanical properties of 140,000 psi tensile strength; 121,000 psi yield; 5-6 pct elongation.

New Cobalt-Tungsten Team

Combining excellent high temperature properties with good castability, a new cobalt-tungsten alloy proves ideal for applications requiring high strength under continuous high heats—up to 1750°F. Stress-rupture properties of this alloy WI-52, developed by Stanford Research Institute, have climbed through control of chemical composition in alloy shot prepared for remelting.

Ups Stainless Strength

Electropolishing increases the ultimate tensile strength of stainless steel wire up to 37 pct. Tests, by the Southern Research Institute, report an increase in the strength of Type 302 stainless steel wire from 276,000 to 374,000 psi. The electropolishing operation reduces the wire's diameter from 0.0495 to 0.023 in.

Speeds Data Processing

An answer to the relatively slow print-out speed of computers is a new computer-readout unit. It's a printer-plotter system that plots out graphical or printed data at 300,000 points per minute. Mass data normally requiring two to three weeks to process can now be ready within a few short hours. Designed and built by Briggs Associates for General Electric, the unit can be used to prove out tapes used in numerical control of machine tools.

Pump Molten Metals

Studies on the effect of molten metals on pumps are underway at the University of Michigan. Aim is to explain how cavitation, or destructive pitting errosion, sends parts of solid materials into the molten liquids. Nuclear power plants use liquid metals such as sodium, mercury, sodium-potassium and lead-bismuth as heat removal media or as powerplant working fluids.

Adhesive Replaces Clamps

Moldmakers, at the Carborundum Co., use a quick-setting adhesive to replace clamps in the assembly of steel facings to maplewood molds. The bonding agent, Eastman 910 Adhesive, tacks the steel facings in place, even at odd angles. Within five minutes the bond has enough strength to allow a moldmaker to drill through both materials.

Longer Tantalum Tubes

Tantalum tubes up to 60 ft long have been drawn in trial production. Laboratory processing shows tantalum has a great potential as a corrosion resistant, high temperature metal. It holds up well under tough service conditions. Cost, now about $100 per pound is expected to drop.

Stop Magnesium Corrosion

A porcelain enamel finishing system provides foolproof corrosion resistance for magnesium alloys. It offers all advantages associated with porcelain enameling. These include: attractive coloration, fine texture, and resistance to chemical attack, scratching and abrasion. Key to the finishing system is a surface pretreatment which solves the adhesion problem. Even at temperatures up to 800°F, no spalling takes place.

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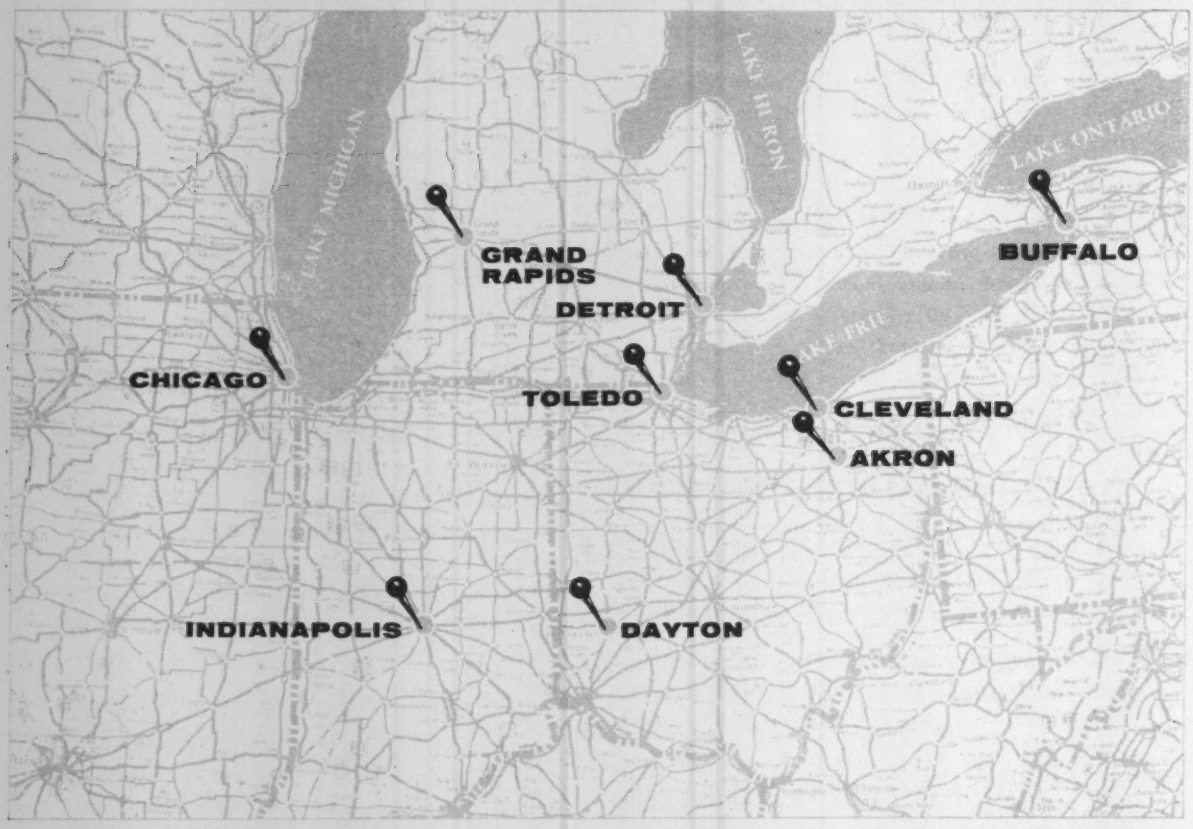

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Schoolwork

Sir—The article appearing under "Special Reports" in your January 14 issue on the subject of "Industry Seeks More Generalists to Fill Top Executive Posts" is extremely interesting to me. I am teaching two classes in engineering administration where this article will be extremely timely.

Accordingly, I am writing to ask if it would be possible for me to secure a substantial number of copies, fifty at least, for distribution to the students in these two classes. —G. S. Schaller, Professor, University of Washington, Dept. of Mechanical Engineering, Seattle, Washington.

▪ **Copies have been sent.—Ed.**

Soaring 60's

Sir—We would like two or, if available, three reprints of Dr. H. T. Hovde's "Soaring 60's: What Business Can Expect in Next Decade."—H. L. Hess, Pres., Lancaster Malleable Castings Co., Lancaster, Pa.

Sir—It will be appreciated if you will send me a reprint of the excellent article "Soaring Sixties" which appeared in the January 7, 1960 issue.—J. L. Everett, Assistant to General Manager, Dravo Corp., Engineering Works Div., Neville Island, Pittsburgh, Pa.

Sir—I have read with interest your January 7 issue and would appreciate receiving reprints of your "Survey Report 1960" and "Soaring Sixties."—W. R. Forster, Engineering Manager, Westinghouse Air Brake Co., Industrial Products Div., Wilmerding, Pa.

▪ **Copies of the article have been sent. Available in a special reprint series containing the "Soaring 60's" is a reprint of a 15 state study of steel use by industry. These are available by request.—Ed.**

From Abroad

Sir—We have had a request from our principals in Gothenburg, Sweden for copies of the following articles which we believe appeared in The IRON AGE entitled "1959 Steel Strike" and "Why Switch to Coated Metals?". Your kindness in making these available to us will be very much appreciated. — E. M. Horen, AB VOLVO, Detroit, Mich.

▪ **A copy of the Steel Strike Booklet and a reprint of the article are on the way.—Ed.**

Some Help?

Sir—I am writing you in hopes you may be able to help me. I have inquired at all places I know of but have been unable to find out where the machinery to manufacture golf balls can be found.—R. L. Radinsky, Ohio River Steel, Toronto, Ohio.

▪ **Sorry, this is a little out of our line. But perhaps one of our readers could help out.—Ed.**

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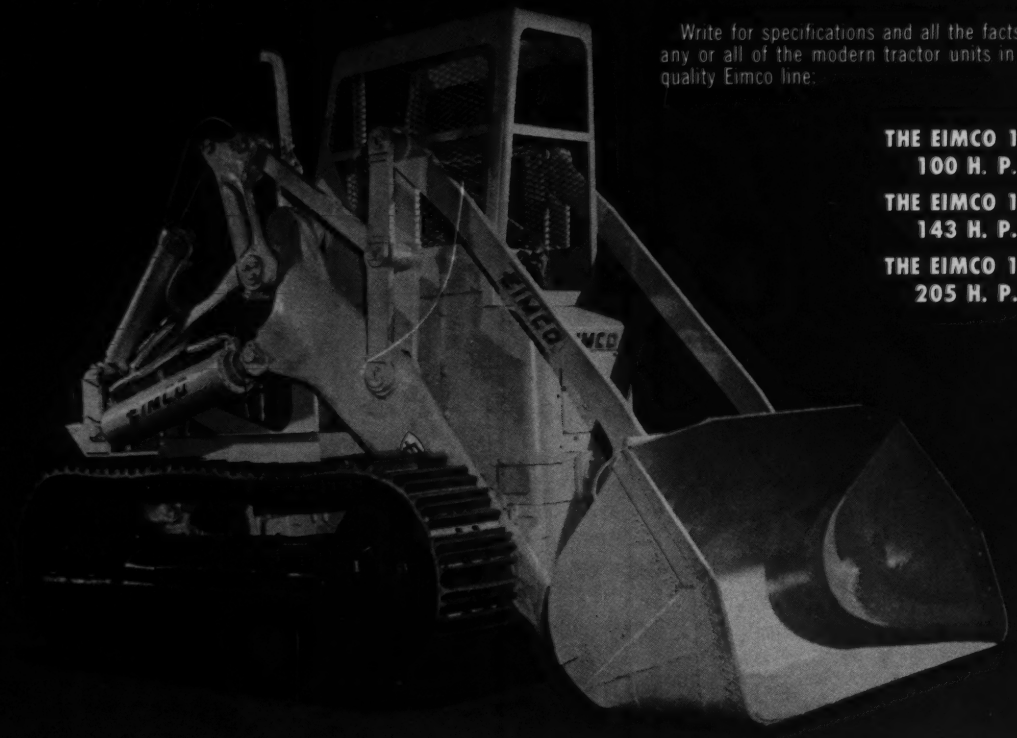

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EIMCO

TRACTOR LOADER DIVISION
634 SOUTH 4TH WEST
SALT LAKE CITY, UTAH — U.S.A.

Just Off the Press

"Who Won in the Steel Contract?" This is the title of a 17-page booklet just prepared by The IRON AGE.

It contains the articles published in The IRON AGE about the steel settlement, how it came about, and what it means. And it includes a reproduction of the telegram sent by Editor-in-Chief Tom Campbell that "broke" the news of the end of the long hassle.

Exact Replica — The telegram, incidentally, is the exact replica of the original. Even the teletype errors have not been corrected. The articles are written by Tom and IRON AGE editors.

The booklet is a sequel to the "1959 Steel Strike" published last November. That booklet carried the stories on the steel labor talks from the start.

The new booklet is available free to anyone interested.

Floor Walking

When hundreds of companies in an industrial exhibition are vying for the attention of potential buyers, a keen competitive spirit is plainly evident.

The use of gimmicks to draw the crowd is far from new. But the IRON AGE editor at the Plant Maintenance and Engineering Show at Philadelphia's Convention Hall last week, reports the "ancient art of gimmickry" has never been more artfully practiced on a grander scale.

Good Line—Among the newer approaches was an arrangement of a fishing pole with its line disappearing into a large wooden box. The strollers were invited to guess the weight of the "fish" on the end of the line. The prize, of course, was the rod and reel, sans "fish."

One company presented a magician to beguile the audience. And another had an artist to draw your caricature, with an air brush. There were drawings on gift certificates and such, Polaroid picture taking, and even a vibrator to ease tired feet. And this was in constant use.

Free Gifts — Mementoes available at almost every booth, included lighter fluid, penetrating oil, key chains, screw drivers, ice scrapers, bottle caps, combs, note pads, soap, candy.

And there was the larger than usual contingency of attractive hostesses with more than the usual amount of information about the products on display.

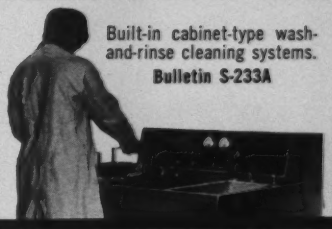
On the Road

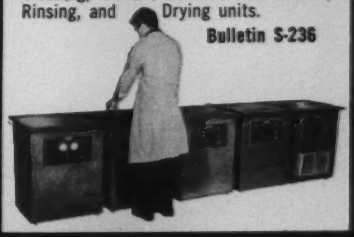
More iron and steel salesmen are driving rented cars. About 7500 cars were leased last year. This is 15 pct more than 1958, and the same increase is predicted for this year.

These figures come from A. J. Schoen, president, Wheels, Inc., a leading car rental firm. He says 34 pct of all cars used by industry are rented. These are worth $18.5 million. Another 30 pct are industry-owned. The rest are owned by the drivers.

Cleaning Problem?
SONOGEN®
Ultrasonic Cleaners by
BRANSON
may be your answer!

½-gallon and larger benchtop models, and (illustrated) 5- and 12-gallon self-contained rollaround units.
Bulletin S-509, S-217B


Built-in cabinet-type wash-and-rinse cleaning systems.
Bulletin S-233A


Modular cabinet-type systems with Cleaning, Filter / Heater / Recirculator, Rinsing, and Drying units.
Bulletin S-236

Custom-engineered cleaning installations: for batch and conveyorized cleaning, and for continuous-flow cleaning in strip and wire mills.
Bulletin S-235

Branson offers experienced counsel in adapting the flexibility of SONOGEN® Ultrasonic Cleaning Equipment to your needs. Tell us the problem, and we'll follow through from planning and installation to maintenance, with factory-trained specialists available nationwide.

Send Coupon to BRANSON ULTRASONIC CORP.
23 Brown House Road, Stamford, Connecticut

BRANSON: Send SONOGEN® Bulletin
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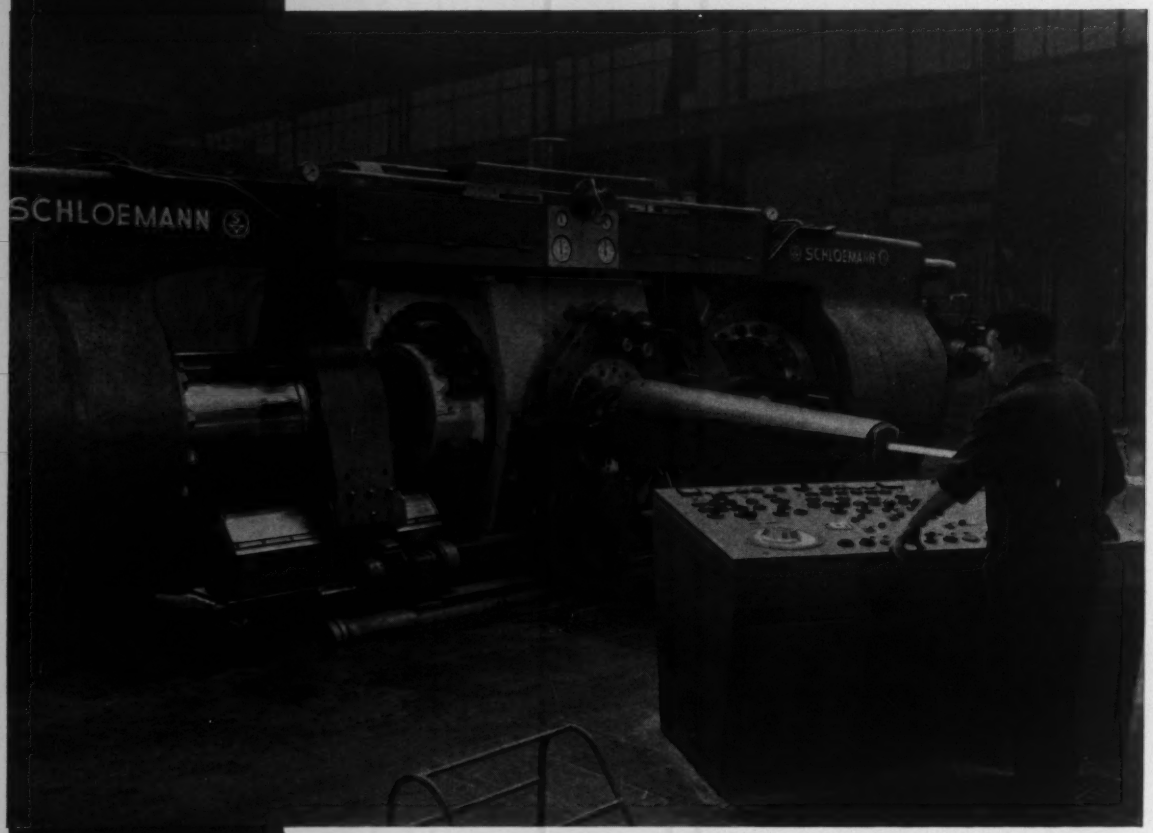
SCHLOEMANN

18 Aluminum Cable Sheathing Presses in two Years



Operational sequence of the SCHLOEMANN aluminum cable sheathing press is now fully automatic, in continuous cycles. Sheathing thickness is held to specification even though extrusion may be interrupted. This press is an outstanding example of many successful innovations accomplished by SCHLOEMANN in connection with the plastic deformation of steel and non-ferrous metals. *Write today for descriptive literature.*

FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.

HOT AND COLD ROLLING MILLS • COUNTERBLOW HAMMERS • HYDRAULIC PRESSES

COMING EXHIBITS

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

MEETINGS

FEBRUARY

American Society for Testing Materials—Committee Week, Feb. 1-5, Sherman Hotel, Chicago. Society headquarters, 1916 Race St., Philadelphia 3, Pa.

Alloy Casting Institute—Mid-winter management meeting, Feb. 4-5, Key Biscayne Hotel, Biscayne, Fla. In-

(Continued on P. 16)

"CALL FOSTER... THEY'LL SHIP PIPE PLUS"

Right! Whether it's a routine order or an emergency request for unusual or hard-to-get sizes, Foster gives you pipe "*plus*."

You get all your pipe when and where you need it, cut to length or fabricated in complete-package shipments, at lowest possible cost.

For non-pressure applications, check the unusual savings on Foster Structural Pipe. Foster's nationwide warehouses stock Tested & Structural Steel Pipe, 1/8" through 48" in all sizes and walls—"*plus*" Stainless, Seamless, Alloy, Pressure, Aluminum, Wrought Iron, PVC Pipe and Valves, Fittings, Flanges.

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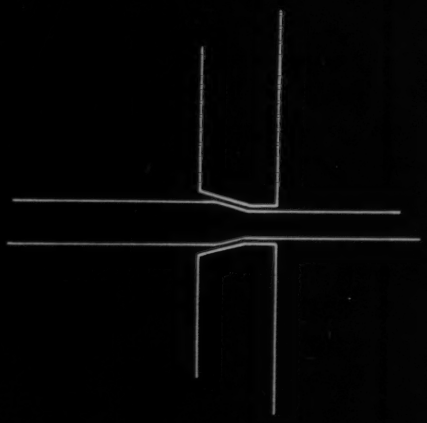


leadership through research

UNION STEEL CORPORATION

DRAWING

MEETINGS

(Continued from P. 15)

stitute headquarters, 1001 Franklin Ave., Garden City, N. Y.

American Coke & Coal Chemicals Institute—Western regional meeting, Feb. 4, The Drake Hotel, Chicago. Institute headquarters, 711 14th St., N. W., Washington, D. C.

Society for Non-Destructive Testing—Symposium on Aircraft Components, Feb. 16-18, San Antonio, Texas. Society headquarters, 1109 Hinman St., Evanston, Ill.

American Institute of Chemical Engineers—National meeting, Feb. 21-24, Biltmore Hotel, Atlanta, Ga. Institute headquarters, 25 W. 45th St., New York.

Industrial Diamond Assn. of America, Inc.—Annual meeting and convention, Feb. 22-25, Hollywood Beach Hotel, Hollywood Beach, Fla. Association headquarters, Box 175 Pompton Plains, N. J.

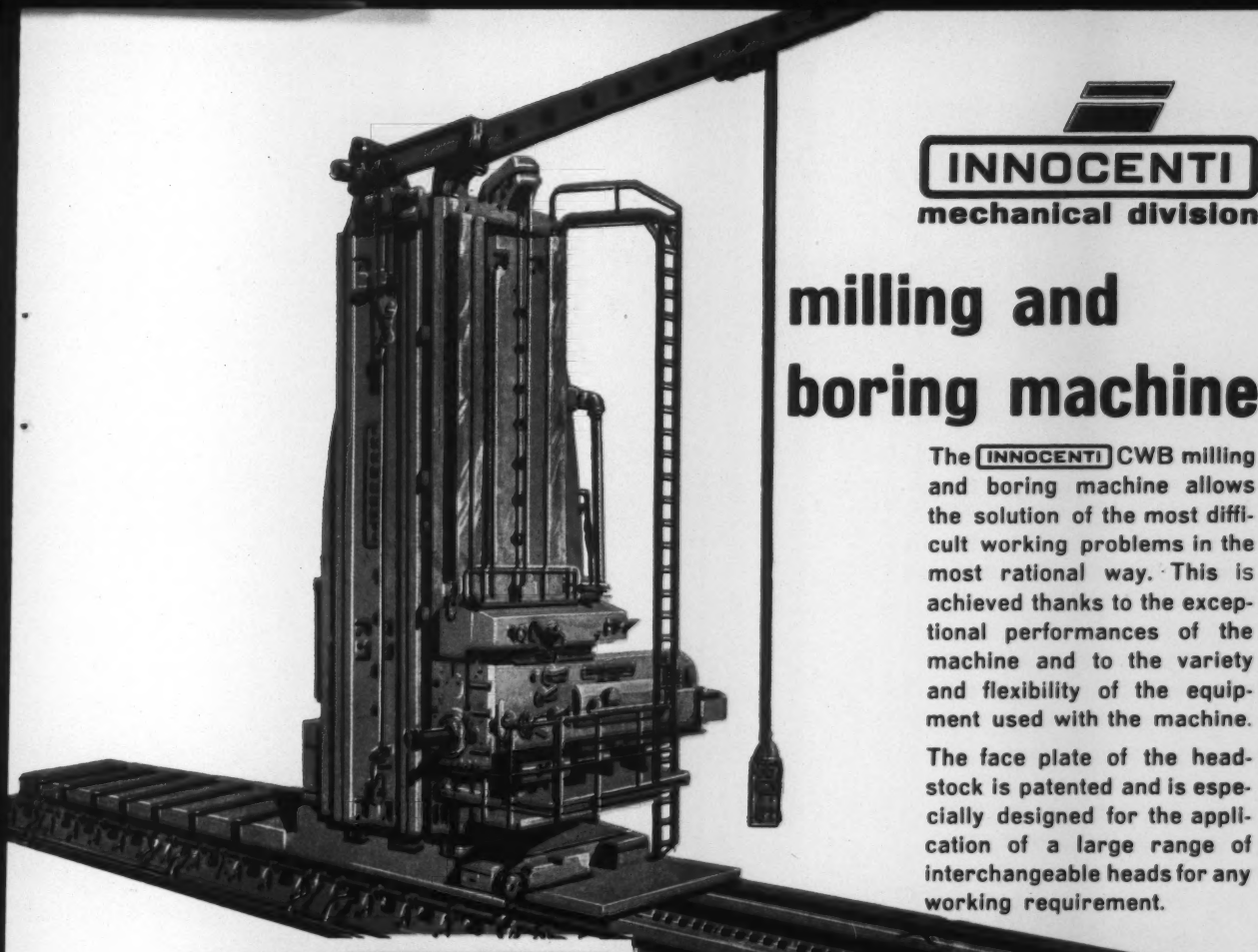
MARCH

Hoist Manufacturers Assn. — Annual meeting, Mar. 1, Hotel Cleveland, Cleveland. Association headquarters, One Thomas Circle, Washington, D. C.

Can Manufacturers Institute, Inc.—Annual meeting, March 7, Waldorf-Astoria Hotel, New York. Institute headquarters, 821—15th St., N. W., Washington 5, D. C.

Assn. of Iron & Steel Engineers—Western meeting, March 7-9, St. Francis Hotel, San Francisco. Association headquarters, 1010 Empire Bldg., Pittsburgh.

Manufacturers Standardization Society of the Valve & Fittings Industry — Annual meeting, March 8-10, The Barbizon-Plaza Hotel, New York. Society headquarters, 420 Lexington Ave., New York.

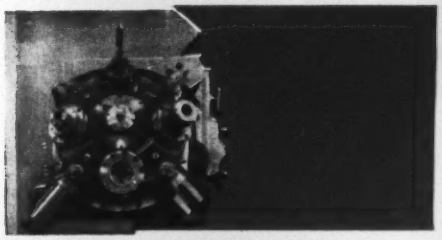


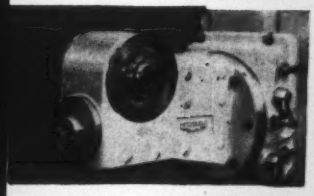
INNOCENTI
mechanical division

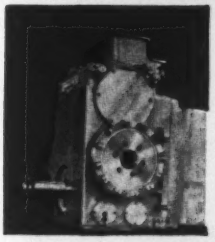
milling and boring machine

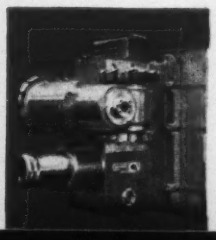
The INNOCENTI CWB milling and boring machine allows the solution of the most difficult working problems in the most rational way. This is achieved thanks to the exceptional performances of the machine and to the variety and flexibility of the equipment used with the machine.

The face plate of the headstock is patented and is especially designed for the application of a large range of interchangeable heads for any working requirement.









INNOCENTI technicians besides the standard types are in a position to study for you the unit that can accomplish the outmost economy in the most difficult stages of your machining operations.

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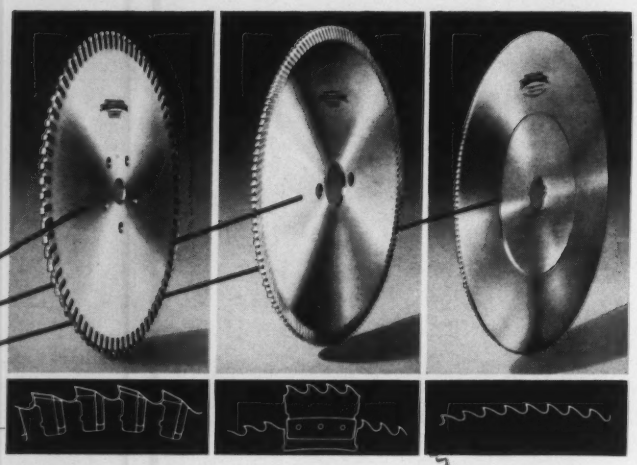
Do you cut ferrous metals? If so, Simonds has three basic saw designs for you:

INSERTED TOOTH METAL SAWS

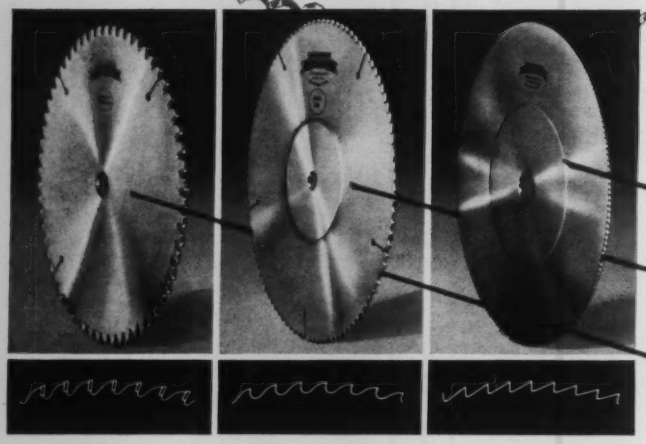
SEGMENTAL SAWS

SOLID TYPE SAWS

Available in High Speed and Semi-High Speed Steels



There's a SIMONDS Circular Saw Exactly Right for Your Metal Cutting Job



If you're cutting non-ferrous metals, Simonds offers you:

SOLID STEEL SAWS
Available in "Si-Maloy", in High-Speed Steel for cutting where extreme abrasiveness is present, and in Semi-High Speed Steel.

HIGH SPEED STEEL, HARD RIM SAWS
Hard cutting edge, soft center gives you long life coupled with safety.

CARBIDE TIPPED SAWS
for cutting aluminum and magnesium, as well as other non-ferrous metals

No matter what kind of metal you're working, there's a quality Simonds blade just right — a blade that means faster, cleaner cuts, longer blade life and maximum performance.

Find out how a Simonds Circular Metal Cutting Saw can mean important savings for you.

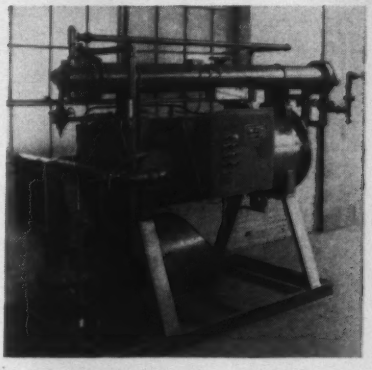
For Fast Service from Complete Stocks
Call your
SIMONDS Industrial Supply DISTRIBUTOR

INDUSTRIAL DISTRIBUTORS — THE RIGHT HAND OF PRODUCTION

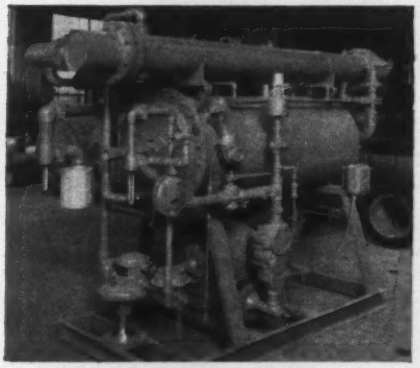
SIMONDS SAW AND STEEL CO.
FITCHBURG MASS

Factory Branches in Boston, Chicago, Meridian, Miss., Shreveport, La., San Francisco and Portland, Ore., Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que.

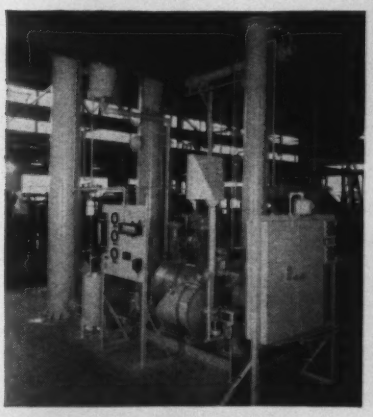
Which of these 3 KEMP GAS GENERATORS *can you use in your plant?*



1 KEMP INERT GAS GENERATOR
—for working non-ferrous metals. Produces inert gases for use at low or high pressure, desiccated or unprocessed. Kemp gives you low-cost gas generation, completely automatic operation. Premixing in exclusive Kemp Carburetor and constant analysis assures highest thermal efficiency.



2 KEMP ATMOS GAS GENERATOR
—for working low-carbon steels. For gases low in carbon dioxide. As in all Kemp Gas Generators, test burner permits checking for proper combustion characteristics before igniting burners. Another safety feature: automatic fire-checks guard against flashback.



3 KEMP NITROGEN GENERATOR
—for working high-carbon steels. Completely eliminates CO_2 from gas, produces 99+% nitrogen. Features the easy start-up typical of all Kemp Generators. Vernier dial can be locked in position to maintain exact fuel-air ratio without further control manipulation.

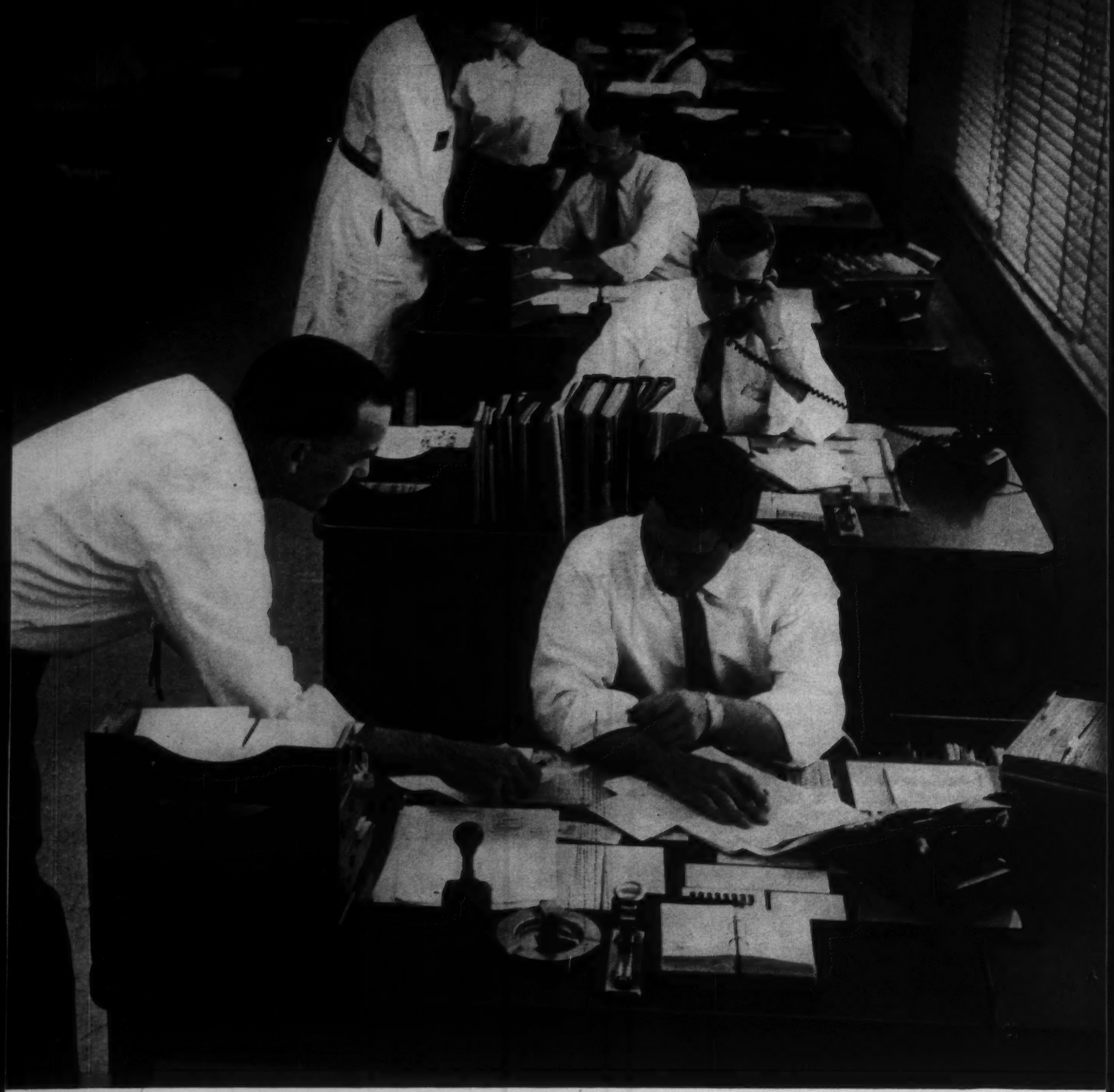
The Kemp representative in your area can advise you on the type and size of generator to best solve your problem. Talk to him or write: THE C. M. KEMP MANUFACTURING COMPANY, 405 E. Oliver St., Baltimore 2, Maryland.

It always pays to come to

KEMP OF BALTIMORE

THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver St., Baltimore 2, Md.

integrated CRUCIBLE steel service



Crucible inside account salesmen (1) simplify ordering and expedite deliveries of the steels you need, (2) arrange for handling extra services, (3) supply you with basic steel and metalworking data.

staffs 32 local warehouses with specialized personnel to solve your specialty steel problems

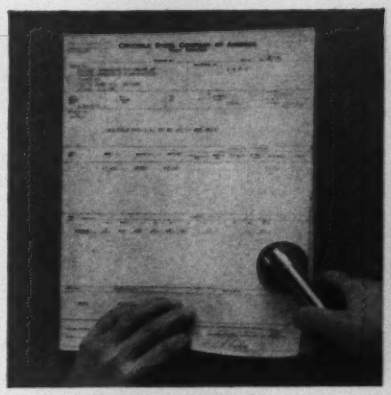
"We frequently rely on Crucible warehouse people," says one of our good customers. "We've found they can sometimes show us more economical steels, sizes and methods than those we're using. Furthermore, they give us valuable help with steels we're using for the first time."

This steel buyer, like thousands of others, believes in getting services with the steels he buys. Here's what he gets:

Crucible inside account salesmen help him simplify ordering, speed up his deliveries. They can efficiently arrange for extra services, such as forging, slitting, grinding and polishing, because of their special training at Crucible mills.

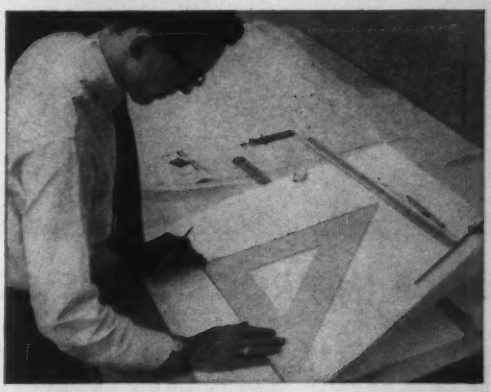
Crucible sales-service engineers give their production and toolroom people valuable metalworking assistance. They'll recommend machining speeds and feeds, quenching temperatures, the best forming and joining methods.

Behind these specialists are the resources of Crucible's entire, integrated operation – from mining the ore to steelmaking to warehouse delivery to you. Why not take advantage of these services each time you order specialty steels? They're available through every Crucible warehouse. *Crucible Steel Company of America, Dept. PB06, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



Need certified test reports for government work? Warehouses can supply the steels and notarized reports of analyses.

Trained, experienced sales-service engineers can help your engineers use steels that are new to you.



This is the easiest way to arrange for forging, flame-cutting — have the warehouse accommodations service do it for you.

STOCK LIST
Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

TOOL STEELS–Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS–Crucible's famous "Rex"® steels; Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS – Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS – Crucible Max-el® rounds, hexagons, plates and brake die steel

ALLOY STEELS – Bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS – Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

HOLLOW TOOL STEEL

HARD FACING ROD

PLASTIC MOLD STEELS

PERMANENT MAGNETS

— and many others

CRUCIBLE STEEL COMPANY OF AMERICA

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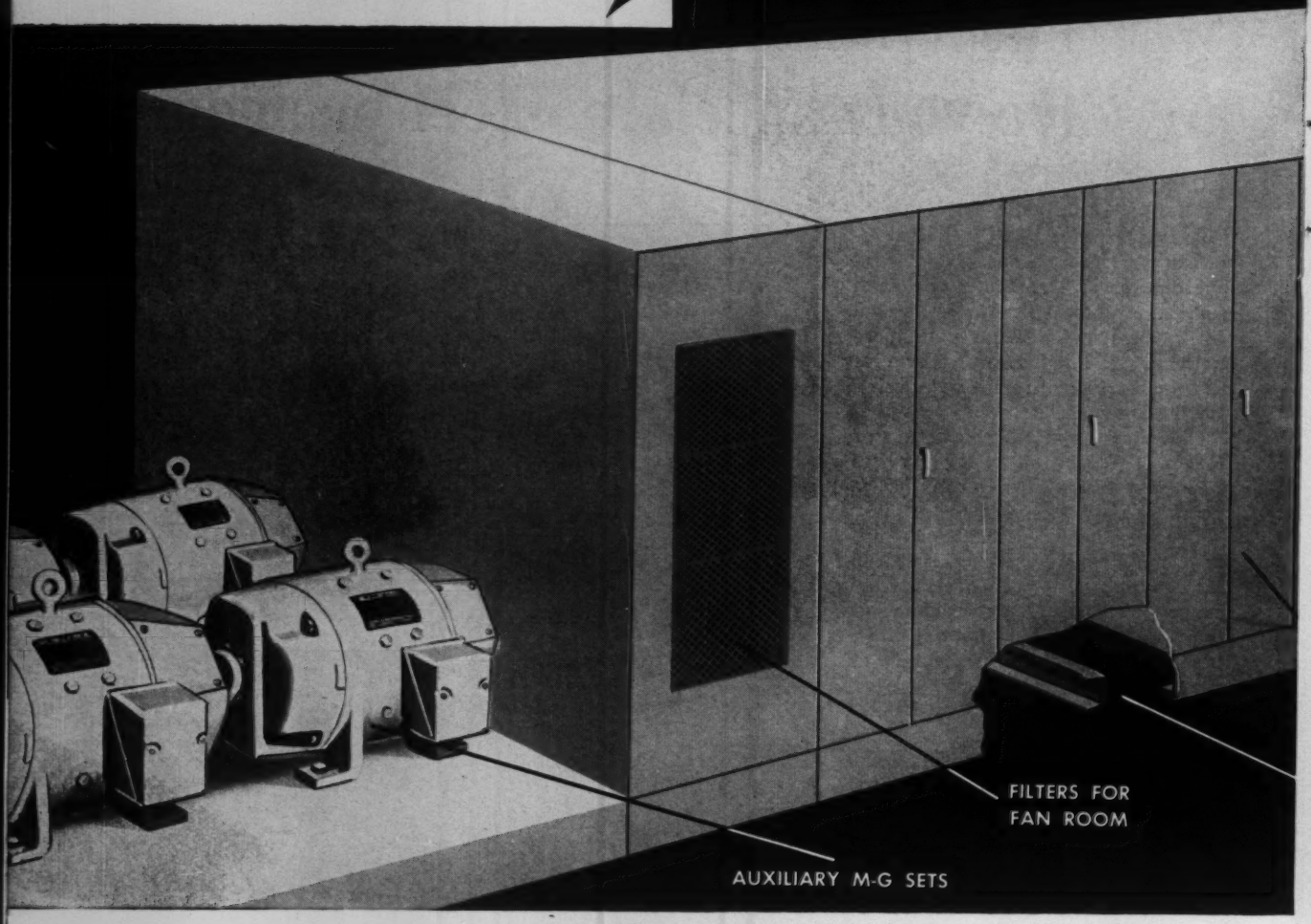
FOR QUALITY... PRODUCTIVITY ... PROFIT

METAL ROLLING AUTOMATED BY GENERAL ELECTRIC



A NEW PRACTICE IN PROCESS-LINE CONTROL

G-E "packaged" motor-control rooms reduce

The latest innovation in modern steel-mill process-line control is General Electric's new "packaged" motor-and-control room. This novel design, developed jointly by General Electric and Jones and Laughlin Steel Corp., groups all controls and m-g sets into one compact centralized unit. The above unit will be installed at J&L's Aliquippa, Pa., works, as part of their continuing facilities-improvement program. Previously, the installation expense on this equipment often matched or exceeded the actual cost of the equipment. The new G-E motor-control room design cuts installation costs as much as 40 percent!

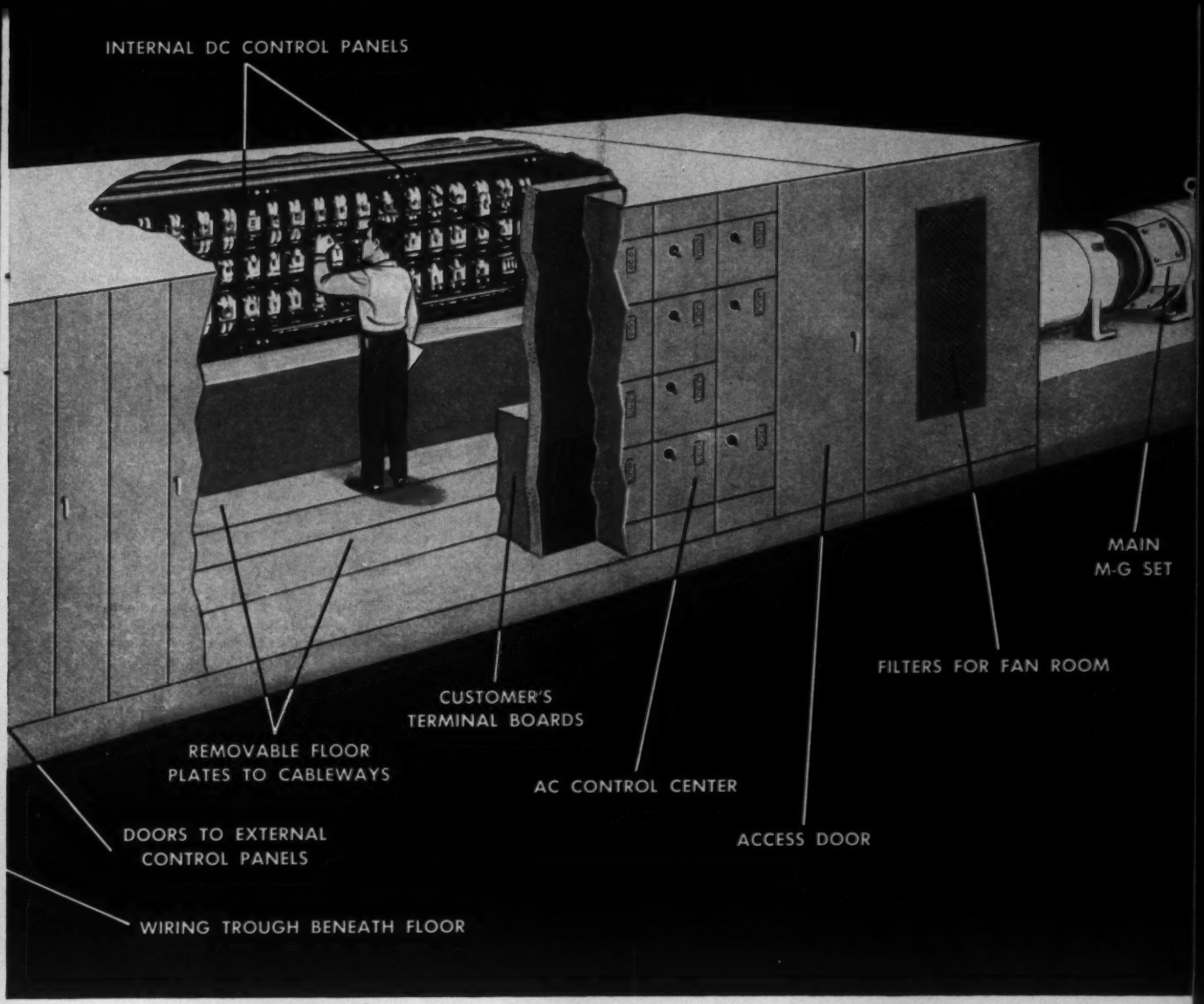
HERE'S WHY INSTALLATION COSTS ARE LOWER

Substantial savings on installation expenses can be realized through these features:

Independent control unit—The General Electric motor-control room is a completely co-ordinated, pre-assembled unit in itself, and in many cases, eliminates the need for a separate motor room. Since the motor-control room is self-contained, it may be located either near the driven equipment or in some previously unused area of the mill.

Field wiring is reduced by one-third or more—All internal connections are made and tested before the motor-control rooms are shipped. The only field wiring required is the connection of the power source and the leads to the operators' stations and the drive motors.

Construction engineering costs reduced—General Electric's grouped control concept enables the mill to know its conduit requirements much sooner. Thus, fewer,



installation costs as much as 40 percent!

less-complex construction diagrams are needed, and actual construction can begin at an earlier date.

Common base minimizes installation time—This new "packaged" motor-control room, delivered on its own self-supporting platform, can be immediately set on a normal mill floor. It does not require expensive, specially-constructed foundations. With m-g sets built and shipped on a common base, the need to align them at the mill site is eliminated. In addition, regulating equipment is factory-tested prior to shipment, further expediting startup time.

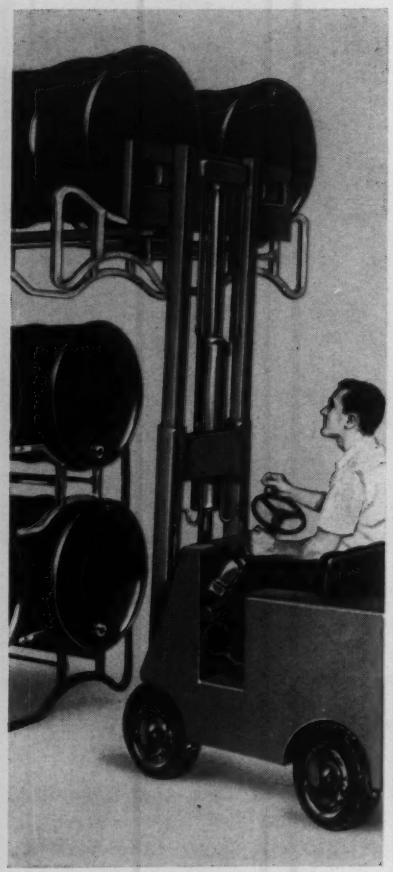
For all the details on this new technique in process-line control, contact your G-E Sales Engineer today! General Electric Company, Industry Control Department, Salem, Virginia, and Direct Current Motor and Generator Department, Erie, Pennsylvania. 785-7

Progress Is Our Most Important Product

GENERAL ELECTRIC

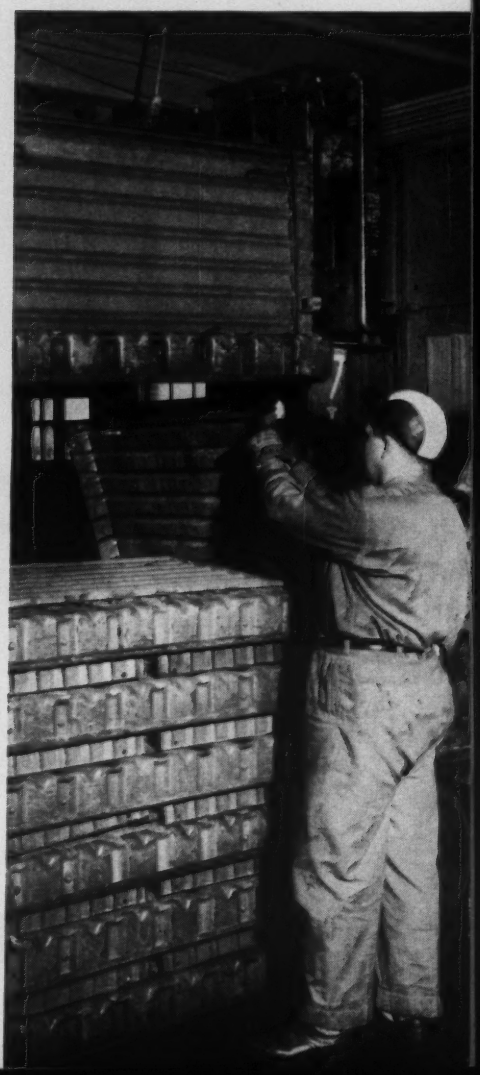
STANDARD REPUBLIC MATERIALS HANDLING PRODUCTS SIMPLIFY CONTAINERIZATON

REPUBLIC WEDGE-LOCK® PARTS STORAGE UNITS are easy to load or unload from either side. And, the heavier the load, the tighter the grip, because patented Wedge-Lock construction includes a post that will not buckle; a concealed sway-proof joint, and a reinforced shelf that does not sag. Unlimited shelf arrangements. Capable of exceptionally high stacking. Republic Storage Engineering specialists will help you plan.



NEW REPUBLIC DRUM RACKS assure stacking of more in-use drums in less space and at lower cost than ever before. Each rack supports two loaded 55-gallon drums. Racks with drums can be stacked to any practical height. Standard fork-lift trucks can pick, move, and stack as many tiers of drums at one time as capacity permits. Shipped knocked down, with fasteners for quick and easy assembly.

REPUBLIC PB-127 COLLAPSIBLE BOXES lower the cost of storage or shipment of empty stacking boxes. Heavy-duty corrugated design delivers long, efficient service at lowest per-year cost. Boxes can be tiered when loaded or empty, collapsed or set up. All parts permanently attached. Ideally suited to shipping castings and other heavy items, the PB-127 Box offers up to 66% savings in storage space.



Moving raw materials through production lines to shipping is faster, easier, more economical, with standard Republic Materials Handling Units . . . key to *containerization.*

Strong, sturdy, Republic Units are designed and produced to withstand abuse of everyday, workday service. Many special materials handling problems can be solved from Republic's full line of standard units, at big savings for you.

Let the materials handling engineers of Republic's Berger Division work with you in solving your materials handling problems. Call your Republic-Berger representative, or write direct.

REPUBLIC STEEL

DEPT. IA-8877 • 1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

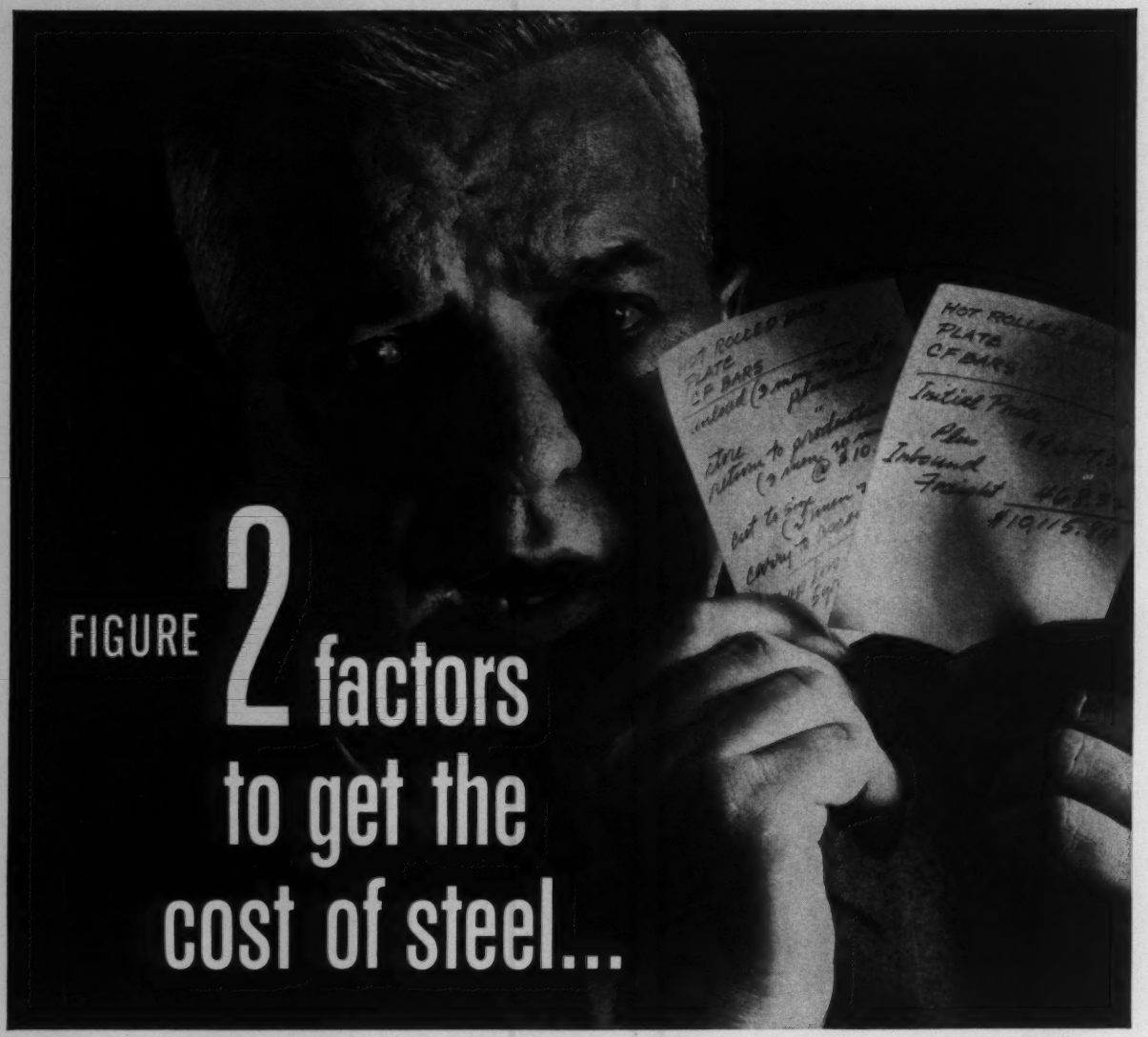


FIGURE 2 factors to get the cost of steel...

Initial price! And COST OF POSSESSION!

If you're putting steel in inventory for later use because you think it's a bargain, compare all your costs, including cost of possession, with the price and *freedom from risk* of buying from your Steel Service Center.

Many steel users have found that using Service Center steel saves expensive storage space and saves the costs of obsolescence, waste, handling and cutting.

When you use Steel Service Center labor and equipment for preliminary processing, you save both the investment and operating expense of having your own labor and equipment.

Use the chart to figure all your costs. For more information, get the booklet, *What's Your Real Cost of Possession for Steel?* Ask your nearby Steel Service Center. Or write to Steel Service Center Institute, Inc., 540-D Terminal Tower, Cleveland 13, Ohio.

COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

Per ton delivered	_____
Cost of capital:	
Inventory	_____
Space	_____
Equipment	_____
Cost of operation:	
Space	_____
Materials handling	_____
Cutting & burning	_____
Scrap & wastage	_____
Other costs:	
Obsolescence	_____
Insurance	_____
Taxes	_____
Accounting	_____
TOTAL	_____

COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

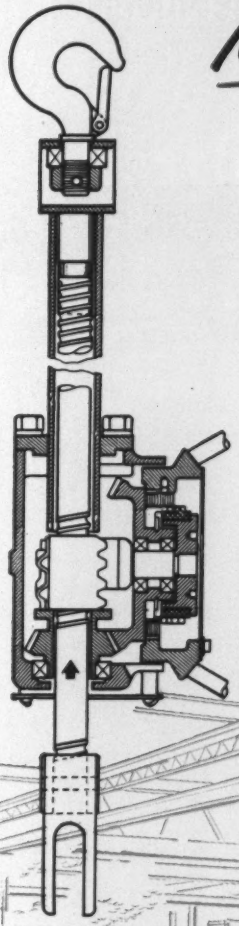
Per ton, cut-to-size, and delivered

TOTAL _____

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER

NEW Whiting Ladle Handler Lifts 100 lbs for Every Pound of Effort!

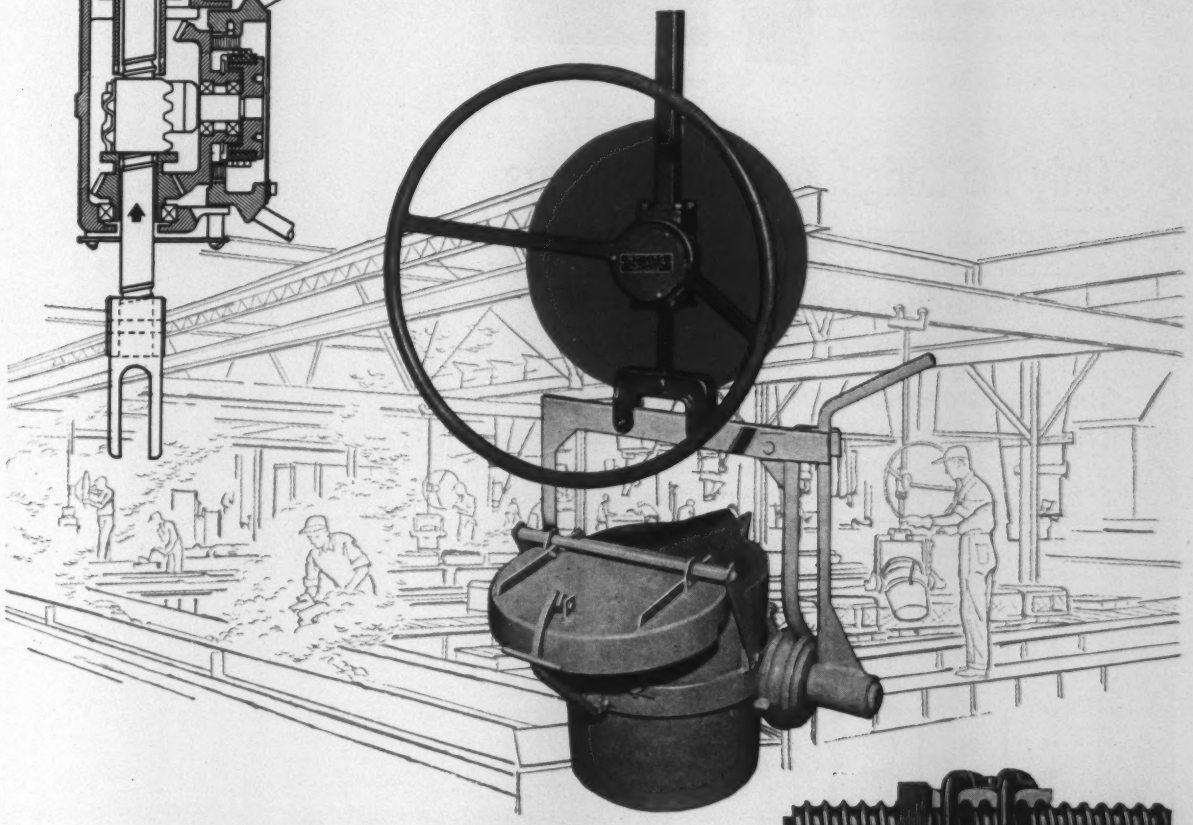


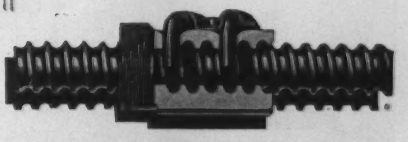
. . . made possible by the Saginaw b/b Screw!

The Whiting Corporation, heavy foundry equipment manufacturers, designed a ladle handler that lets the operator manually raise and lower a gross weight of over 2250 pounds with maximum ease and control. The Saginaw Ball Bearing Screw got the actuation job!

A turn of the handwheel on the new 'H-E' Ladle Handler transmits torque to the Saginaw Screw which converts *rotary* motion into *linear* motion with over *90% efficiency*. This, with a unique clutch-brake spring, helps the operator LIFT 100 POUNDS FOR EVERY POUND OF EFFORT, and maintain control at all times! The Saginaw Screw also provided savings in maintenance, wear, parts and weight.

The Saginaw Screw may be able to improve your product's performance and increase its sales acceptance. Write or telephone Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Michigan—*world's largest producers of b/b screws and splines.*





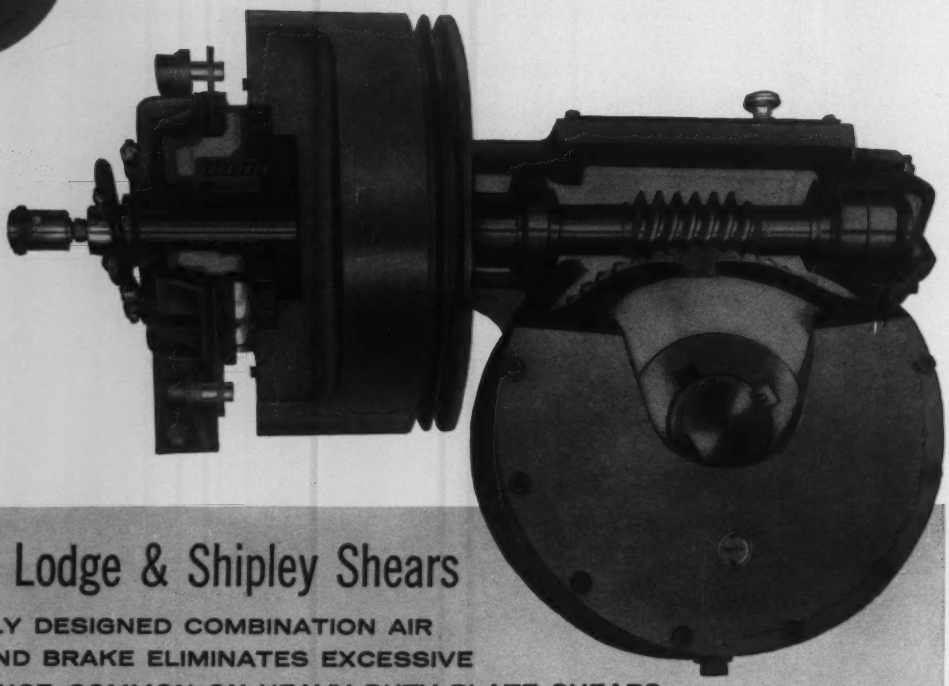
A Size and Type for Every Need...

Have been built as small as 3/16 in. B.C.D. and 1½ in. long, as large as 6 in. B.C.D. and 40 ft. long. Larger sizes can be built to your order.

Saginaw b/b Screw

WORLD'S MOST EFFICIENT ACTUATION DEVICE

EXTRAS on the machine . . . not on the invoice!



Only on Lodge & Shipley Shears

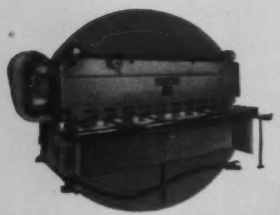
...SPECIALLY DESIGNED COMBINATION AIR CLUTCH AND BRAKE ELIMINATES EXCESSIVE MAINTENANCE COMMON ON HEAVY DUTY PLATE SHEARS

The "standard extras" you find on Lodge & Shipley Shears, although not reflected in the price, are important in time-saving, effortless operation, accuracy and low-cost service.

THE COMBINATION AIR CLUTCH AND BRAKE, for example . . . its single unit design positively eliminates overlap between clutch and brake. Disc-type construction is self-adjusting for fast, smooth starting and safe, positive stopping. The clutch provides automatic overload safety; the brake applies automatically in the event of electrical or air supply failure.

NO OTHER SHEAR, EVEN AT EXTRA COST, can offer the exclusive combination of features found, for instance, on the ½" Lodge & Shipley Shear:

- 2-stage Hydraulic Holddown System
- Remote-operating Foot Control • Ball Transfer Table
- Motorized Front-Operated Back Gauge
- One-piece Shaft with Integral Eccentrics
- Blade Clearance Indicators • Air Counterbalances
- Air-cushioned Back Gauge • Blade Changing Jigs
- Fast, One-man Upper Blade Adjustment
- Independent Holddown Fingers • Quad-life Worm Gear



Capacities to ½" x 12'

Find out how much more you get . . . **WITHOUT EXTRA COST** . . . on a Lodge & Shipley Shear. For details, see Sweet's Machine Tool File or request Bulletin No. PS-15 from: **The Lodge & Shipley Co., 3073 Colerain Ave., Cincinnati 25, Ohio.**

Lodge & Shipley Your LODGE-ical Choice!

WAGNER Dry-Type *General Purpose* Transformers

...WHISPER WHILE THEY WORK

New... from Wagner... totally enclosed dry-type transformers *filled with epoxy compound.* Their designation: Type AE Single Phase, 1 to 10 Kva.

Use these transformers for all general purpose applications, including those where noise must be minimized. They have a low sound level... the result of encasing smaller Form W core and coils in solid epoxy compound. The compound insulates, reduces sound-producing vibration caused by core excitation ... and provides enough support and mechanical strength to eliminate the need for metal framework and other subassemblies that are subject to vibration. *The result:* a whisper-quiet transformer that can be used anywhere, even in quiet areas of offices and hospitals.

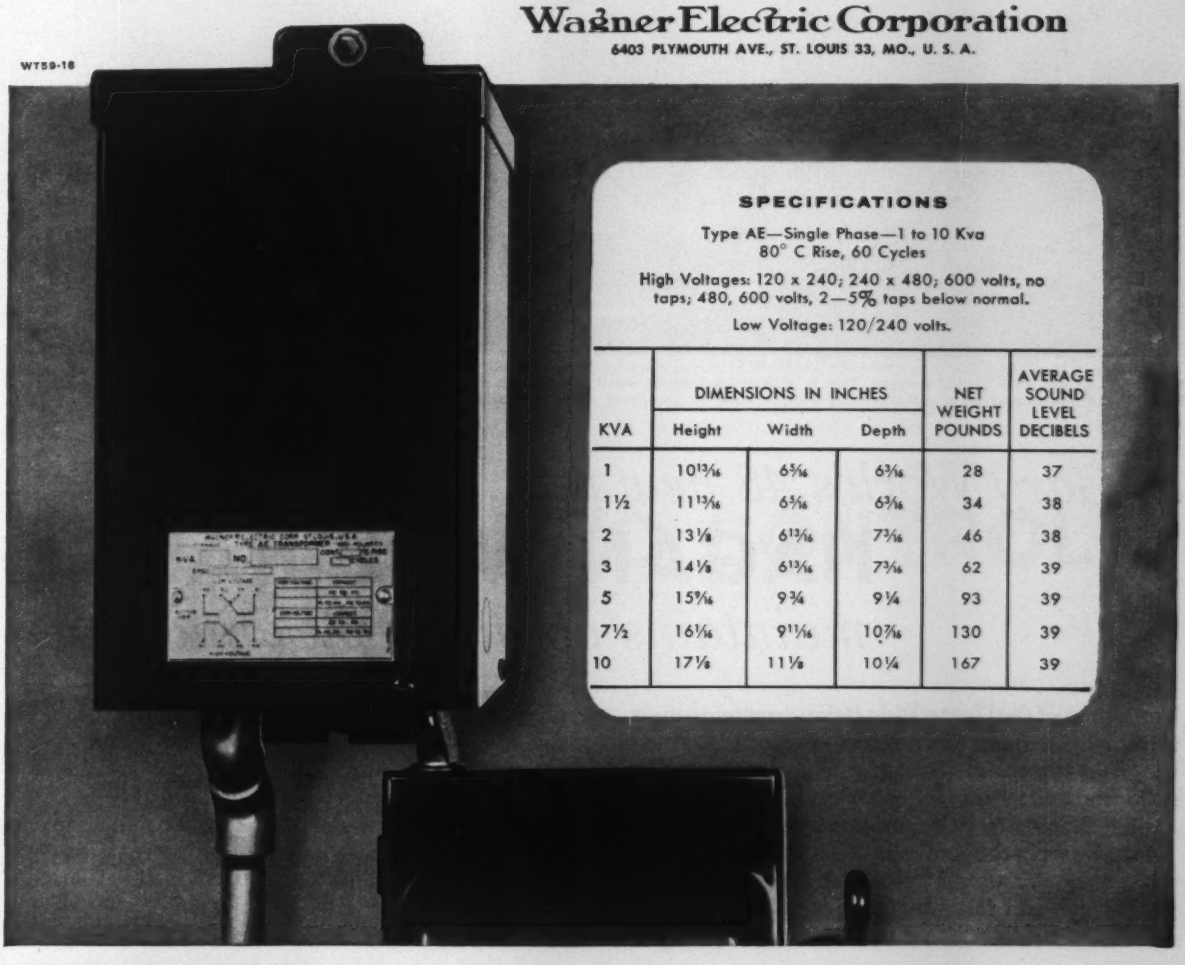
Wagner Type AE transformers do more than silence sound, of course. They improve voltage regulation, and have better insulation protection (suitable for continuous operation at 80°C in a 40°C ambient). All parts are sealed from dust, moisture and corrosion by the epoxy compound. Naturally, every unit is built to conform to all applicable standards of ASA and NEMA.

Wagner Type AE transformers can be installed indoors or out... in any location where they will not be submerged or exposed to injurious fumes in concentration. They are compact and lightweight and can be mounted in any position, at any angle... on walls, floors, or ceilings.

Like to know more? Wagner branches and distributors have all the details. There's one near you. Call or write now.

Wagner Electric Corporation
6403 PLYMOUTH AVE., ST. LOUIS 33, MO., U. S. A.

WT59-16



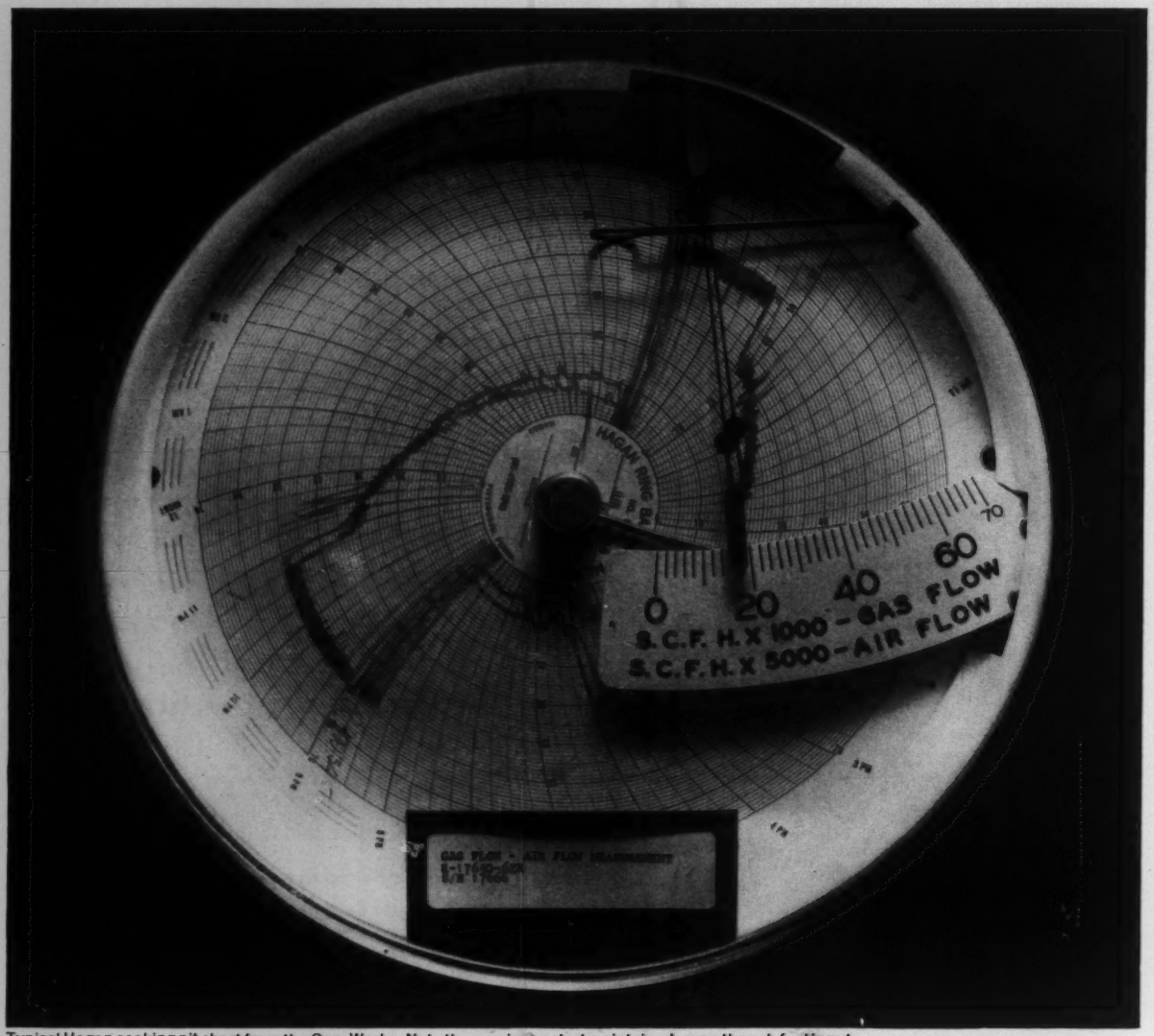
SPECIFICATIONS

Type AE—Single Phase—1 to 10 Kva
80° C Rise, 60 Cycles

High Voltages: 120 x 240; 240 x 480; 600 volts, no taps; 480, 600 volts, 2—5% taps below normal.

Low Voltage: 120/240 volts.

KVA	DIMENSIONS IN INCHES			NET WEIGHT POUNDS	AVERAGE SOUND LEVEL DECIBELS
	Height	Width	Depth		
1	10 13/16	6 5/16	6 3/16	28	37
1½	11 13/16	6 5/16	6 3/16	34	38
2	13 1/8	6 13/16	7 3/16	46	38
3	14 1/8	6 13/16	7 3/16	62	39
5	15 5/16	9 3/4	9 1/4	93	39
7½	16 1/16	9 11/16	10 7/16	130	39
10	17 1/8	11 1/8	10 1/4	167	39



Typical Hagan soaking pit chart from the Gary Works. Note the precise control maintained, even though fuel input falls to 7% of full scale during soakout. This is a Dual Ring meter which records air and fuel and integrates fuel. Notice how excess air is automatically programmed at low firing rates to maintain good circulation.

at Gary Work's 48 new pits . . .

HAGAN WIDE RANGE

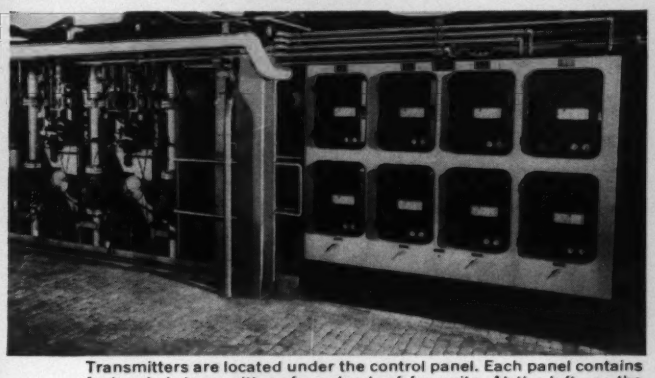
maintains optimum pit atmosphere

The ability of the Hagan Ring Balance meter to maintain high accuracy down to 6 to 8% of full scale is the main reason for the performance of the fuel-air ratio control system on 48 new dual-fuel pits at United States Steel Corporation's Gary Works.

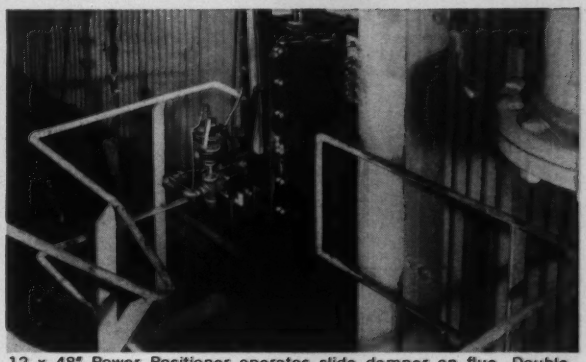
Pit atmosphere conditions are held throughout the soaking cycle at the correct point to produce optimum scale, and full advantage is taken of the fuel economies made possible by modern pit design. In addition to fuel-air ratio, Hagan controls include flue pressure and combustion air pressure. Ring Balance meters are used for both transmitting and recording, and control panels are also Hagan.

These systems were supplied as a complete package. Control panels had all equipment installed, piped and pre-calibrated, so that installation consisted of connecting up impulse lines, and making minor adjustments. As a consequence, the new Gary

General view of Surface pits. Control panels are housed above pit level, with the transmitters directly below.



Transmitters are located under the control panel. Each panel contains fuel and air transmitters for a bank of four pits. At the left are the Hagan Power Positioners and Hagan V-port butterfly valves which control the flow of CO gas.



12 x 48" Power Positioner operates slide damper on flue. Double reeved to move the full length of the 96" damper, this Positioner easily handles the more than 2 ton weight. Hagan Power Positioners are available in a full range of sizes for any positioning job.

FUEL-AIR RATIO CONTROL
at all firing rates

pits were put into service with a minimum of delay.

Hagan metallurgical furnace control systems, both pneumatic and electronic, offer a degree of accuracy and reliability that contribute substantially to steel plant economy of operation. A Hagan engineer will be glad to show you how Hagan systems are helping steel producers maintain greater product uniformity and increase production. Write for new bulletin, "Hagan Soaking Pit Control Systems," MSP-177.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Flumendosa No. 13, Milano, Italy

THE NEW NAME WITH THE FAMILIAR RING!

This new name combines three old names of the Induction Heating business—Ajax Engineering, pioneer in 60-cycle melting; Ajax Electrothermic, pioneer in high-frequency melting; and Magnethermic, pioneer in Induction Billet Heating.
This old "new" company now offers the most complete line of Induction Heating equipment, the most experienced staff and the largest facilities of any manufacturer of Induction Heating equipment. This combination of experience, facilities and product line permits an unbiased evaluation of your heating or melting application.

"induction heating is our only business"

AJAX Magnethermic CORPORATION

GENERAL OFFICES
P. O. BOX 839
Youngstown 1, Ohio

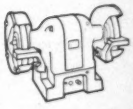
TRENTON DIVISION
930 Lower Ferry Road
Trenton 5, New Jersey

YOUNGSTOWN DIVISION
3990 Simon Road
Youngstown 1, Ohio

3 ways to cut costs in grinding—

—all power-built by Black & Decker!

Whether you must take the work to the tool or bring the tool to the work, Black & Decker gives you a choice of grinders to save time and money.



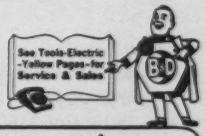
Powerful B&D Bench Grinders save steps—speed up jobs when strategically located about your shop. Smooth running B&D motors give more constant speed, regardless of load. Four models: 6″ to 10″ sizes.

Precise light-weight B&D Die Grinders deliver top quality work at high speeds whether shaping, burring or grinding. Handle as easily as a pencil. Vibrationless—perfectly balanced from one end to the other. Smooth operation—perfect for carbide bit use. In sizes #8, #12, #20.

Time saving B&D Portable Grinders go to the work where surfaces must be prepared for welding and finishing. Perfect for smoothing welds, snagging and grinding castings and countless other grinding, cleaning and buffing jobs. 2½″, 5″ and 6″ sizes available.

50th YEAR

Leading Distributors Everywhere Sell



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QUALITY ELECTRIC TOOLS

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THE BLACK & DECKER MFG. CO., Dept. 0902
Towson 4, Md. (In Canada: Brockville, Ont.)

☐ Please arrange a demonstration of a B&D Grinder.

☐ Please send additional information on _____

Name _____ Title _____

Company _____

Address _____

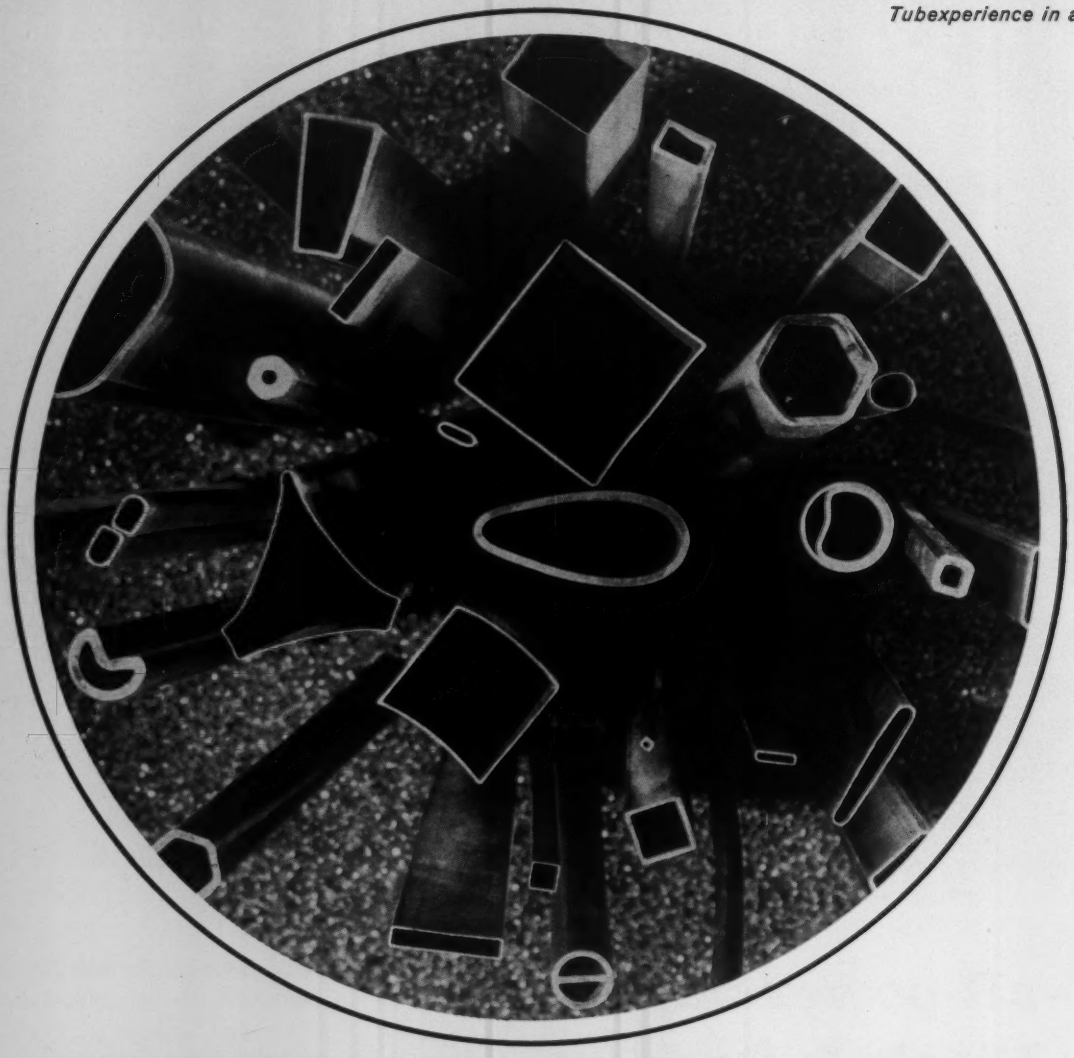
City _____ Zone _____ State _____

☐ Drills

☐ Scruguns®

☐ Magnetic Drill Presses

☐ Sanders



Tubing shaped to New Ideas

Many people think of tubing only in its most common form—round. As design engineers and buyers, you know it can be produced economically in a large variety of unusual shapes. But have you ever seen the particular shapes illustrated on this page? They are samples from production runs formed to extremely close tolerances to satisfy specific design requirements. End uses include Bourdon springs, surgical instruments, batons, aircraft structural parts, gun drill shanks, radar screens, door latches, electrical equipment, antennas, golf club shafts, fishing rods and bushings. However, we don't know where all the different shapes are used, or why they are required. But our ability to form them saves manufacturers in many industries considerable time and money in the fabrication of their products.

Superior regularly produces shaped tubing in many analyses of stainless steel, carbon and alloy steels, nickel and nickel alloys, and glass sealing alloys. Also in titanium and beryllium copper. Shaped tubing is generally supplied in the as-formed temper (annealed before shaping), but many special tempers can be supplied.

We can probably supply your requirements at low cost, in good time. Data Memorandum No. 17 gives full details about Superior Shaped Tubing. Write for a copy today. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

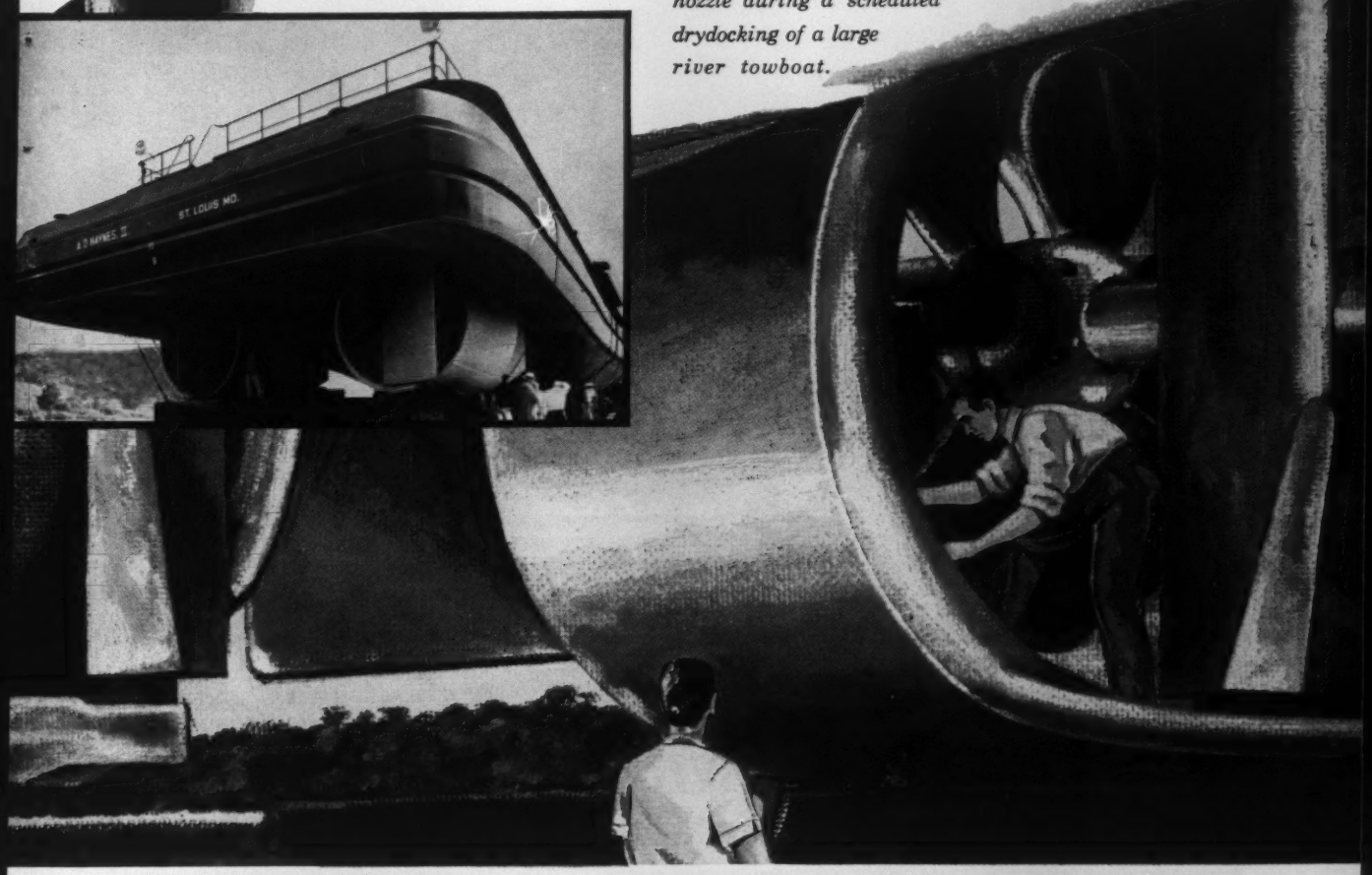
The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to 5/8 in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

...where industrial progress is cast in steel



General Steel service engineers inspect a recently developed cast steel Kort nozzle during a scheduled drydocking of a large river towboat.

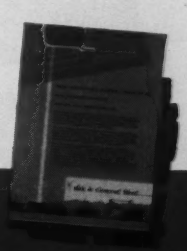
FIELD SERVICE...PERSONALIZED PRODUCT ATTENTION

Attention to detail . . . inspection in the plant . . . assistance with assembly . . . inspection again while in use . . . and most important of all, service when you need it . . . these are all parts of General Steel's complete service.

When unpredictable events occur, General Steel service engineers are available to you to help return your units to service with minimum delay.

Representatives from every department . . . engineering, manufacturing, sales . . . are available to work closely with you from concept—to casting—to completed product. Let us show you the benefits of this integrated service in helping you plan components of your products . . . in cast steel, cast weld or composite structures.

Write for folder How General Steel Castings Can Improve Product Design and Performance. General Steel Castings, Station 201 Granite City, Illinois



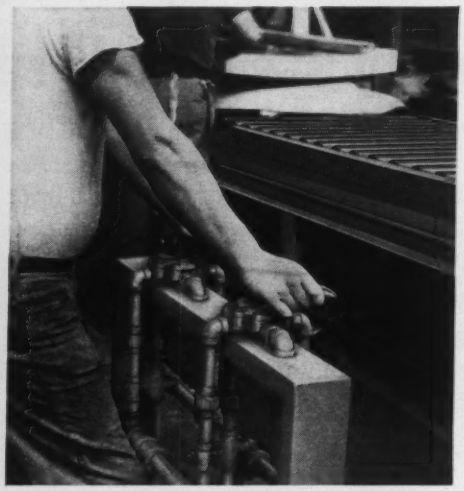
GENERAL STEEL CASTINGS

GRANITE CITY, ILL. • EDDYSTONE, PA. • AVONMORE, PA.

Shipping end of new Logan conveyor at Weirton Steel Co., division of National Steel Corp., Weirton, W. Va.

Logan *Plant-Dynamation* speeds

Line weighing station of the Weirton system is a Logan-installed hydraulic lift which operates recording scales. Custom cut bundles weigh in at 1,500 lbs. to 10,000 lbs. Gravity rollers at the series of work stations are succeeded by live roller sections which hurry the bundles on to shipping. In the shipping area, gravity sections take over once more.



Hand-controlled hydraulic brakes and electric start-stop buttons give conveyor sections full flexibility of pace. Constantly varying size of bundles and differences of work time for different steps dictated this important design feature.

Now each man bundles steel 15 times faster. A crew of seven men now wraps and bands over four times as much custom-sheared strip steel as 26 men could before the system was installed. Steel moves from shearing area on a series of live roller sections separately controlled by crane operators (left, above). Then crane places stacks of steel on wrappings spread over first of a series of gravity roller sections. Gravity rollers convey bundles through banding area (right, above). Then, through weighing, hydraulic line alongside gravity conveyors operates control brakes at work stations.

production at Weirton Steel Co.

Weirton Steel Company's big new Logan conveyor line shows what conveyor design *can accomplish*. The 375-ft. system is made up of successive sections of Logan power and gravity rollers teamed with overhead cranes to match the variable pace of Weirton's strip steel bundling operation. The result: seven men now easily prepare four times as much steel for shipping as 26 men could before! Details of the installation and Logan's Plant Dynamation technique are shown and described on these pages.

Logan conveyor design helps harness ***all*** *the work-power potential of your plant*

A major key to output for any plant is the unique pattern and pace of its potential work flow.

To exploit this "dynamic principle" of a plant—to put *all* its productive energy to work—*one right* custom-designed conveyor is required.

The Logan technique of Plant Dynamation insures this one right system for your plant. The Logan engineer works with you through a complete analysis; then section by section he designs and specifies the complete conveyor *dictated* by the dynamics of your operation. Your plant may call for maximum or partial automation.

Over the half century in which assembly-line production itself has grown up, Logan engineers have proved and extended their exclusive Plant Dynamation technique. For example, in your area "The Man from Logan" is one of a group with an average of fourteen years of this vital experience.

Only a complete-line conveyor company like Logan has the wide range of products to back up Plant Dynamation. To give your plant its *one right* system, the Logan engineer specifies freely from one of the industry's most comprehensive lines of conveyor equipment. The Logan engineer commands five distinct power modes: gravity, electricity, hydraulics, pneumatics, and control electronics.

"The Man from Logan" stationed near you is quickly available. This qualified specialist in Logan Plant Dynamation works directly with your engineers through design and installation to smooth operation. Write or phone today for a conference on the dynamic possibilities of your plant.

Logan Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE 6, KY.

How To Cure Cutting Problems With

STARRETT Production-Proved HACKSAWS

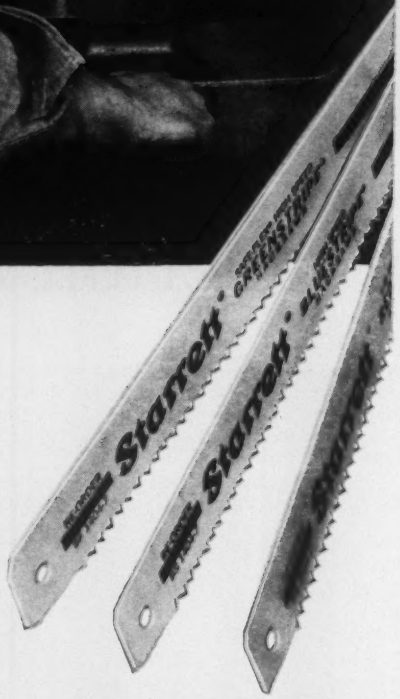
Use the Starrett color code to solve your hacksaw cutting problems — to get quicker, straighter, cleaner cutting with longer blade life. When blades wear out fast, shatter or bog down on hard-to-cut materials, follow this simple formula:

Specify Starrett REDSTRIPE SM® special alloy high speed steel blades for general purpose shop cutting or for production cutting on a wide range of shapes and materials.

Specify Starrett GREENSTRIPE SAFE-FLEX® high speed welded edge blades for heavy feeds, gang sawing and interrupted cuts — safe, shatterproof, unbreakable.

Specify Starrett BLUESTRIPE® high speed steel blades for high speed production cutting and hard-to-cut materials.

Your nearby Industrial Supply Distributor has Starrett production-proved hacksaws in a complete range of hand and power sizes — also Starrett band saws, band knives and hole saws. Call him for quality products, dependable service . . . or write for Starrett Saw Catalog. Address Dept. IA, The L. S. Starrett Company, Athol, Massachusetts, U.S.A.



Starrett®

World's Greatest Toolmakers

HACKSAWS

Starrett Precision Makes Good Products Better

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK • HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES

Here's the quick, low-cost way to get any Controlled Surface Finish

Are you paying more than necessary to obtain *controlled surface finishes?* You probably are if Gisholt Superfinishing is new to you. You are losing time, money and paying a premium for quality as well, on many jobs.

With Superfinish you preselect the surface finish you need—as high as 80 or as low as 1 micro-inch RMS—and you get it faster, at less cost than by any other method. Rather than an expensive extra step, Gisholt Superfinishing actually eliminates tedious, more costly processes.

Not only do you save time and money, but you get a "controlled" surface finish, free of smear metal—with the true base metal exposed—one that provides greater area contact for heavier loads and longer life in your specific application.

Whether your job requires a 1, 20 or 80 micro-inch finish, setup is fast and easy. Nothing is left to the operator's skill or judgment. Stone pressure and grade, and reciprocation rate are preselected to produce the finish you require, for job lots or large production runs.

It will pay you to find out how Gisholt Superfinish can cut costs, improve quality and lengthen service life on your standard or problem parts. Ask your Gisholt Representative or write for Bulletin 1169.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

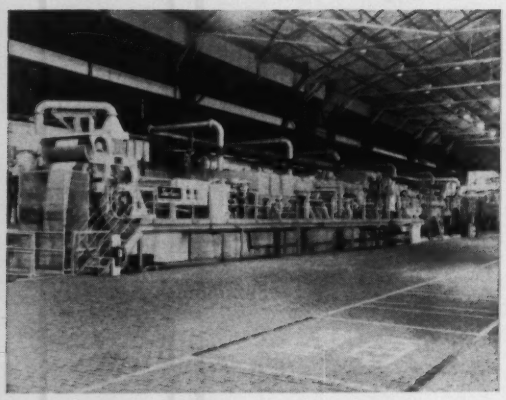
Investigate Gisholt's Extended Payment and Leasing Plans

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • *Factory-Rebuilt Machines with New-Machine Guarantee*

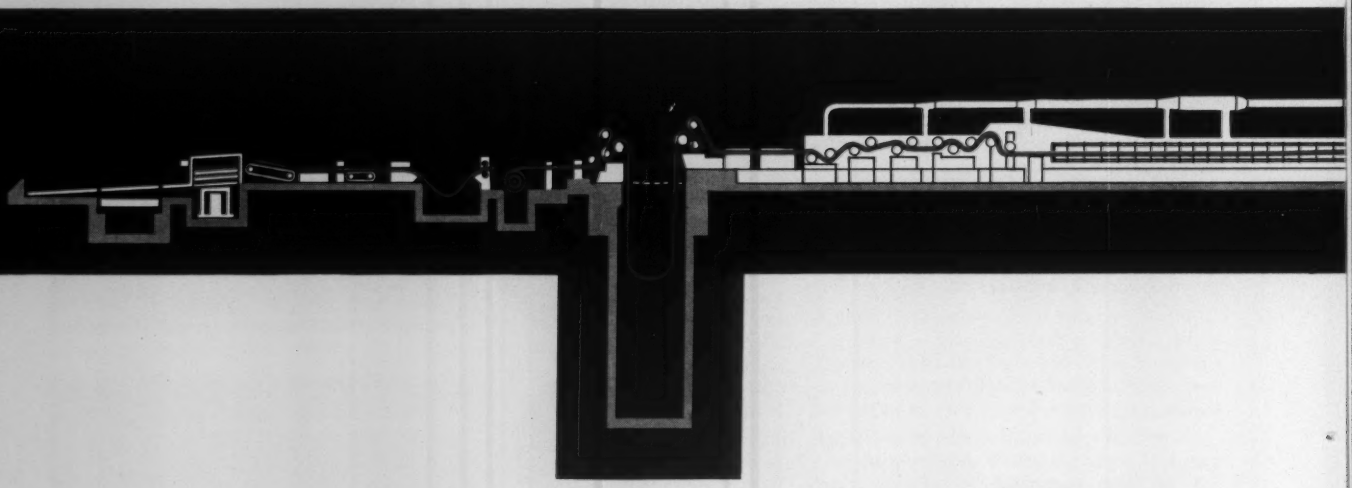
complete normalizing line:

ALL SURFACE!

Exit end of the line, showing looping pit, "recoiler," automatic shear and sheared sheet piler.

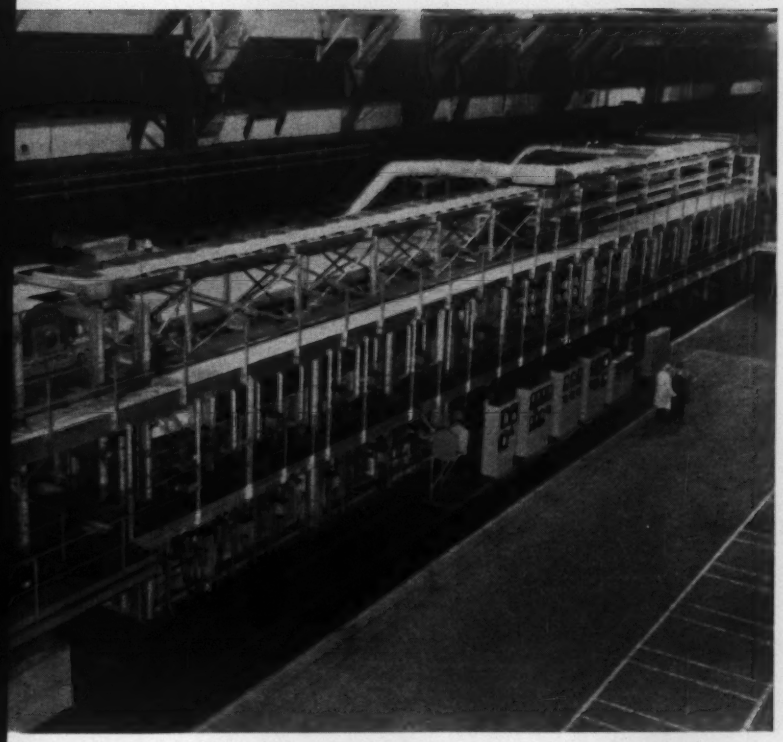


Pickling section includes acid bath, water rinse tank, brush scrubbers, alkali tank and dryer, all installed by Surface. This view shows the exit end of the section.

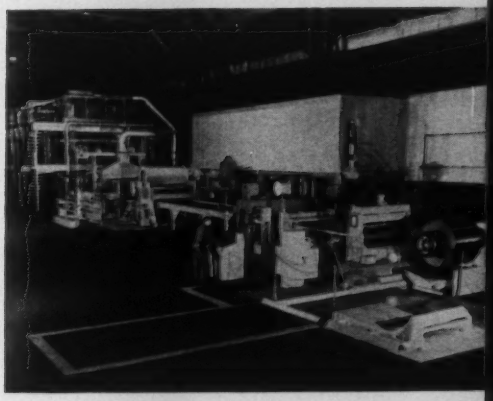


from payoff...to payoff

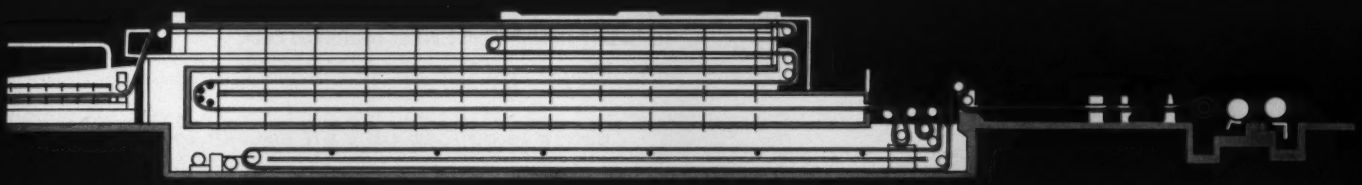
Worldwide engineering and manufacturing facilities through associates in Australia • Belgium • France • Germany • Great Britain • Italy • Japan



Rockwells in the low 40's are achieved consistently in this three-level normalizing furnace. Heating zone is on the lower furnace level; convection cooling in the middle; air blast cooling at the top. A horizontal "looper" is located underneath the furnace.



Payoff reel marks the entry of low carbon stock after cold rolling. Speeds of 150 fpm on 60" wide strip are attained.



This complete new Surface normalizing line for vitreous enamel stock started paying off on its first day of operation. For example, its capacity of 30,000 lbs. an hour puts this mill forcefully into the market for deep draw quality strip. More than adding new selling power, this big line increased productivity per operator by an almost unbelievable amount.

From payoff reel to real payoff, the entire installation is a graphic demonstration of Surface's qualifications as prime contractor. Applying its global experience in metallurgy, combustion, chemistry, and mechanization, Surface engineered and installed the complete line.

Take the opportunity now to evaluate the prime contracting skills available at Surface, and mobilize them for your profit, ***wherever heat is used in industry.***

Surface

SURFACE COMBUSTION *2402 Dorr Street, Toledo 1, Ohio*

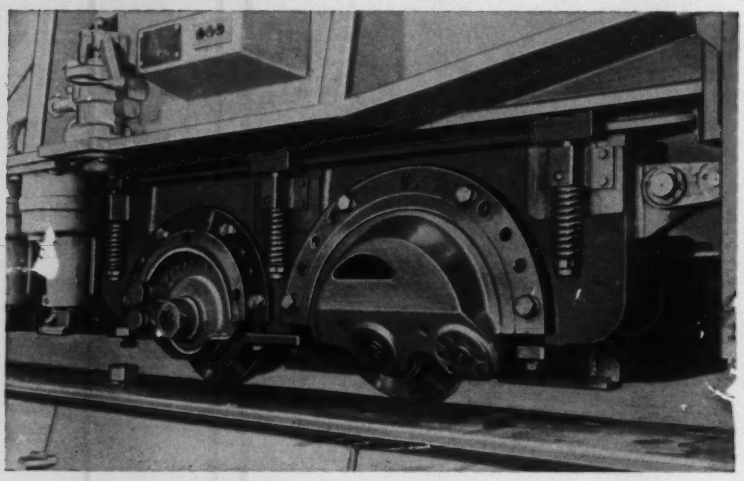
A Division of Midland-Ross Corporation

A Completely New Method Of Heavy Duty Shearing

by

SCHULZE & NAUMANN

Roller Shears



Close-up of carriage with shearing rollers for straight and bevel cut

Schulze and Naumann Roller Shears bring you an entirely new concept of heavy duty shearing—providing tremendous improvements in accuracy, quality of cut, speed and economy over older, flame cutting methods. Most models can even be built as combined shear and plate edge planers.

Shearing Principle. Plates are sheared between a lower knife and an upper roller shear. A powerfully driven carriage carries two shearing heads, one for straight and one for bevel cuts.

Planing. Powerful planing equipment can be added to produce, for example, double vees or profiled edges. Planing capacity can be much larger than shearing capacity.

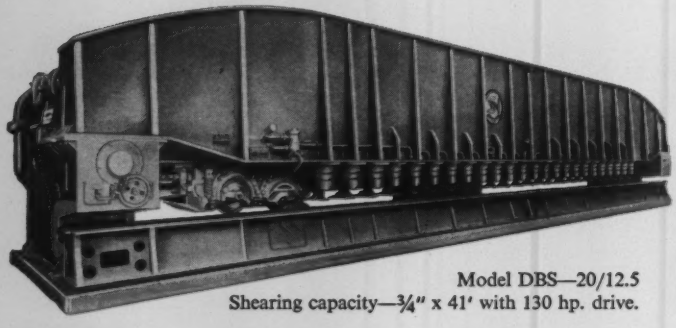
Capacity. Plates up to 1½″ thick by 55 feet long can be sheared in one setting.

Accuracy. Extremely rigid design and powerful, positive hold-downs guarantee cuts of unequalled accuracy and quality.

Speed. Shearing speeds up to 112 feet per minute are possible. An S&N Shear will cut a greater total length in one day than any other method.

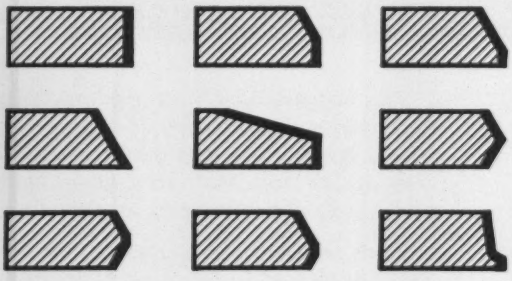
Versatility. Any type of edge preparation is possible, including straight, beveled or combined cuts.

Five different models to suit your needs.



Model DBS—20/12.5
Shearing capacity—¾″ x 41′ with 130 hp. drive.

EDGES PRODUCED ON S & N ROLLER SHEARS



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Importers of Leading Precision Machine Tools
Nationwide Sales and Service
COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

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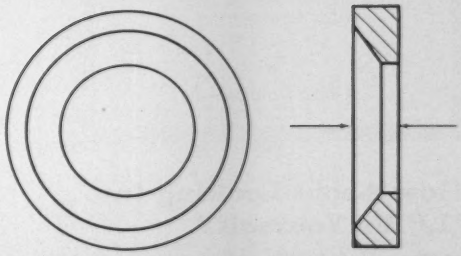
Disc life up 71% with new Gardner GR structure control

...new Gardner abrasives grind 43,567 *more* valve inserts than former discs

production facts

Part	Valve inserts
Material	Carbon steel
Hardness	35 to 60 Rockwell
Machine	Double Disc Grinder
Disc size	26" x 2" x 10"
Production life	Former discs—61,000 parts New Gardner discs—104,567 parts



Find out how Gardner's latest developments in abrasive discs can lower your grinding costs! Call your Gardner Abrasives Specialist or write for AC-57 Catalog.

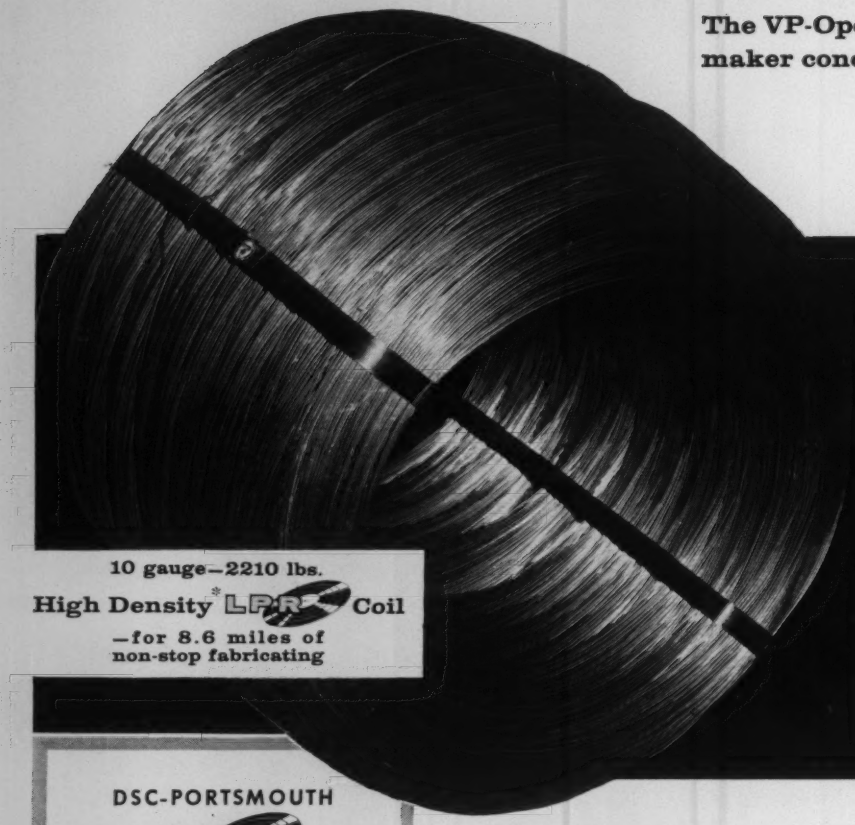
GARDNER

abrasive discs

BELOIT, WISCONSIN

The VP-Operations of a big mattress maker concluded:

*"With *LPR Coils we need set up just once vs. 10 to 15 times with Traditional Size Bundles"*



10 gauge—2210 lbs.
High Density *LPR Coil
—for 8.6 miles of non-stop fabricating

How a Brite Wire User Sold Himself

DSC-PORTSMOUTH
*LPR
CONTINUOUS LENGTH BRIGHT WIRE COILS

LOW AND MEDIUM CARBON
.072″/.500″ inc. (to about 4200 lbs.)
.023″/.071″ inc. (to about 1000 lbs.)

HIGH CARBON
.072″/.250″ inc. (up to about 4200 lbs.)
.023″/.071″ inc. (up to about 1000 lbs.)

COIL DIMENSIONS ON REQUEST

*A DSC TRADE-MARK

Dyed-In-The Wool Small Coil User

A nationally known mattress maker bought Spring Wire and also Low Carbon Basic Wire in 150 to 200 pound coils. Would he change to bigger coils? Never!

Then an Eye-Opening Visit

Finally a DSC Customer Rep persuaded the Purchasing Agent to arrange for as many officials as he pleased to visit our Portsmouth Division Rod and Wire Mill. They came—the VP-Operations, the Plant Manager and his Assistant, and the Assistant Purchasing Agent.

A First Step Toward Cost-Saving

The visitors were conducted through the mill, shown how their wire was drawn in 1200 pound coils which then had to be split into 150 to 200 pound bundles. The visitors conceded they ought to use standard 300 pound bundles "as a starter to cut setup time." *Their* words, not ours.

A Further Step in the Right Direction

After they had watched our big *LPR's going into Welded Wire Fabric, we showed them about 12,000 pounds of No. 3 Brite Border Wire which had been drawn for them, and was ready for splitting into 60 to 80 small bundles. They caught on—instructing us to change their order to 2,000 pound coils. Next day we shipped them 6 coils weighing 12,055 pounds.

The Visitors Sold Themselves on *LPR's

Next they spotted a lot of Spring Wire in 2500 to 3000 pound *LPR's ready for shipment to another customer. Said the VP-Operations, buttonholing his Plant Manager, "For every time this *LPR user sets up, we have to stop work and set up 10 to 15 times!" Turning to Uno Johnson, our Rod and Wire Mill Superintendent, he remarked, grinning, "We're sold. Ship us a 2,000 pound *LPR of 10½ gauge Spring Wire so we can start preparing ourselves for handling up to 3,000 pound coils."

How About Looking Into *LPR's Yourself?

*LPR's cost no more per pound than traditional mill weight coils. Actually they cost less considering how they help cut your fabricating costs, coil-end scrap loss, materials-handling expense, etc.

For complete information about *LPR's or about visiting our mill, just call your nearest DSC Customer Rep or write to Detroit Steel Corporation, Box 4308, Detroit 9, Michigan.

Performance Proved DSC

DETROIT STEEL

Flat Rolled and Wire Products

CUSTOMER "REP" OFFICES IN PRINCIPAL CITIES

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INDUSTRIAL PRICING IS A CRITICAL PROBLEM. Cross-currents of new labor settlements, marketing problems, and election year factors complicate an already confused picture. A reliable forecast figures industrial prices will rise about twice as much as last year, but only about half the rate of postwar years. Price increases will tend to be selective, rather than general.

FOUNDRIES WILL GO ALL OUT ON CAPITAL SPENDING to expand or improve facilities in the next two years. More than $6.5 billion will be spent for facilities, supplies, materials and services, the American Foundrymen's Society reports. A large share of the funds will go to modernization, but capacity will also be increased. One point of interest: Capital needs of smaller founders (per ton of capacity) are greater than for larger producers.

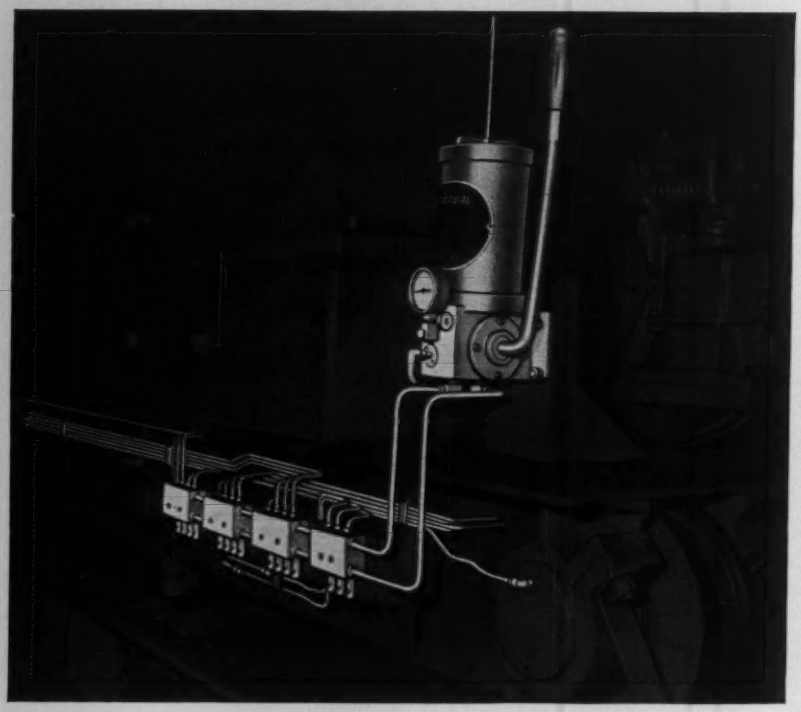
BUYING POWER OF THE AMERICAN WORKER is on the upgrade. The average rose more than 2.5 pct between November and December as the economy rebounded from the steel strike, the Dept. of Labor reports. Factory workers' spendable earnings rose to an all-time high of $82 per week for a worker with three dependents.

A NEW TREND IN COMPUTER CONTROLS in the steelmaking industry broke into the open last week. National Steel revealed plans for computer controls on a hot-strip mill for the company's Great Lakes Steel Div. Throughout the steel industry, at least nine major computer controls are going into mills.

AIRCRAFT MAKERS ARE MAKING A BIG move into new fields. They'll look less and less like plane makers as they try to diversify. On the West Coast, the trend is well under way. Major aircraft makers are deep into electronics, communications, general construction, even shipbuilding. Those staying in aircraft are making a big play for international markets.

REVERSALS OF SOME CONSTRUCTION TRENDS will not prevent a new building record in 1960, the Dept. of Commerce predicts. Total outlays should reach $55.3 billion. Trend reversals: Housing will decline 6 pct after a gain of 25 pct in 1959; private nonresidential building will rise 19 pct after a decline last year.

IT'S A GOOD BET THAT CONGRESS WILL BOOST President Eisenhower's $41 billion defense budget by at least 10 pct. Present debate over conflicting reports of USSR strength is an indication of what's coming. Additions will come in missile funds.



Farval lubrication keeps Westinghouse crane on 'round-the-clock operation

Here's a close-up of the trolley of Crane No. 187 at Westinghouse Electric Corporation's giant East Pittsburgh Works. It was recently "Farvalized" along with the bridge to permit continuous operation at top efficiency for long periods of time—without downtime for expensive grease gun and oil can types of manual lubrication.

Note how the valve bank has been manifolded so that all points in valve operation will be visible to the operator as he "shoots" the system.

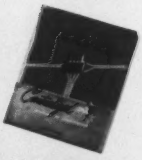
Farval Centralized Lubricating Systems make sure that accurately metered amounts of lubricant will reach every vital crane bearing from a safe and centrally located station. These versatile Farval systems easily deliver any pumpable lubricant—show substantial savings in both time and lubricant.

Plant operators report, "Farval lubrication is safe, and dependable. We find crane repairs and maintenance are reduced—operating power consumption much less!"

Farval Studies in Centralized Lubrication No. 248

Farval Division • Eaton Manufacturing Company
3282 East 80th Street • Cleveland 4, Ohio

Ask your local Farval Representative for the complete story on how all types of industrial machinery and equipment produce better, more economically when "Farvalized." It's also contained in free Bulletin 26-S. Write for your personal copy, today.



Pressures of Climbing Costs Force Higher Price Levels

Industry is caught in cross-currents of higher costs and delicate market problems.

But some price increases are inevitable as labor and materials costs mount.

■ Industrial pricing is under pressure from all sides. With the economy more sensitive to prices than ever, the pressures that are the strongest will have a lot to do with the direction of business this year.

And this applies not only to overall business, but to specific products as well. Industrial buyers have a wider range of choice than ever, and an ill-timed price move can cut into business.

Upward Trend Continues — In spite of intense pressure to keep prices at current levels, a mild inflationary trend is likely to continue this year. Increased costs of materials and services can not all be absorbed by industry.

But the immediate price outlook is uncertain at best. Throwing in a presidential election, a bundle of labor contracts up this year, and the still uncertain steel prices, and the picture becomes confused.

The Outlook—One steel mill's purchasing forecast, which has the reputation of being correct in the past, sees prices going up, down, and sideways. Here are some projections:

1. Overall purchasing costs for the year will average two to three pct over the level of late 1959. Higher prices will add $1 to $2 a ton to the cost of making steel.

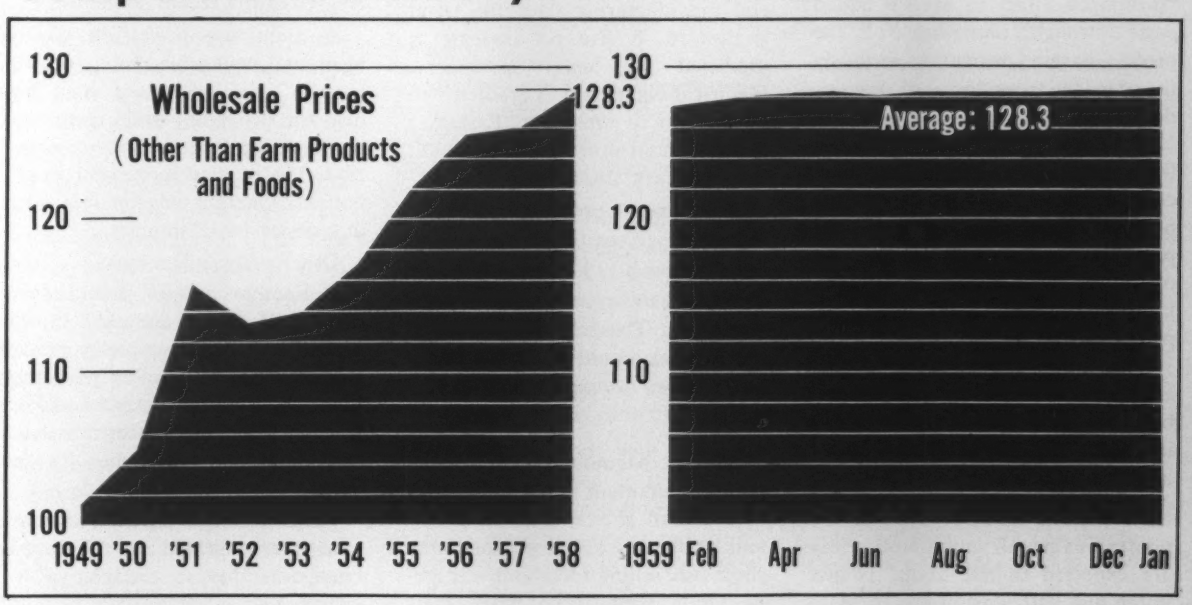
2. Prices of some commodities will move both up and down during the year. Sharp first-half increases for aluminum will be partially offset by a tapering off in the second half.

3. Prices in some lines will go up on a selective basis. Clay and brick will be the only refractory items to rise significantly.

This particular forecast is of interest because it has been running within a fraction of a pct of dead center in recent years. Long-term commitments and emphasis on raw materials distort the figures a little. But the base is broad enough to provide a general guide.

Some Factors—General factors included in this forecast are labor negotiations, demand, and politics. Negotiations in electrical, railroad

Comparative Stability: Will It Last?



BLS Index 1947-49 = 100

Steel Prices Caught in the Middle

Pushing Up

1. **Direct employment cost increases.**
2. **Strong demand that would sustain a higher level.**
3. **A continued period of inflation with higher costs of materials and services used by steelmakers.**

Holding Down

1. **Improved technology and hope for worker cooperation to improve productivity.**
2. **Competition from foreign steel.**
3. **Competition from other products.**
4. **Enough capacity to meet all but extreme demands.**

and other industries will put upward pressure on prices. Working against increases will be the adequate supply of most products and political considerations of an election year.

These forces figure to balance out differently for various industries. However, the big question, steel prices, is still unanswered. And little light on the steel price outlook came out of annual reports and statements from the industry last week.

Steel Reports—The strongest hint of price increases came from J. L. Mauthe, chairman of Youngstown Sheet & Tube. He said that any "prolonged effort to absorb added costs through narrowing of the profit margin would seriously threaten the soundness of the industry."

Others were less committal, but the conclusion was this: The direct costs of the new labor contract are not yet determined. A lot will depend on union and worker cooperation in increasing productivity. If costs go up significantly, steel prices will go up too.

The outlook, then, is for no general price increases before November, but probably some selective increases. In 1961, general price increases are likely.

Aluminum Trend — Among the nonferrous metals, aluminum prices are expected to rise about 10 pct in the first half. Part of this increase has already been applied and labor costs are forcing a bigger jump. However, a market easing in the second half is expected to force prices down again. Overall, the year is likely to bring an average increase of five to seven pct.

Copper is expected to follow a similar pattern, moving up in the first half and down in the second. A four pct increase is predicted for zinc. Tin is moving up slightly, although European developments could upset the prediction in a hurry. Lead prices are weak now and reductions are likely.

More Than Last Year—In general manufacturing lines the trend is upward. A five pct increase is predicted for heavy machinery. Electrical equipment is predicted to go up two to three pct. Fasteners figure to hold firm in the first half, then increase about three pct.

If the overall estimate holds true, industrial prices will rise about twice as much as last year, but only about half the average rate of postwar years. The selective nature of the increase could be a big factor in market competition among metals.

Steel vs. Aluminum—On this last point, aluminum producers may face a hard choice between profits and markets. Last year, aluminum sheet was selling for about 45¢ per lb. On a semi-official basis, sheet was being offered canmakers at prices of 32¢ to 35¢ per lb.

According to one steel analyst, the lower prices put aluminum somewhere in the range of cost competition for small six-ounce cans. The question is whether aluminum can stay in this range if steel prices do not go up this year.

Upward Pressure—Recent price increases in aluminum were called "restoring" aluminum to 1957 price levels. Moreover, F. L. Magee, president of Alcoa, said they did not reflect the 25¢ added to employment costs since 1957 and did not take into account labor cost increases of the recent settlement.

If aluminum prices do go up again and steel prices hold, you will have a situation where steel has held for two years while aluminum has gone up twice in the same period. The relative movement would not make market development work any easier for aluminum.

Other price indications:

Refractory prices should hold firm until about midyear. In the second half, basic and clay grades will move up while other refractory items show no change. Overall, refractory prices are expected to average about one pct higher for the year.

Prices of metallurgical and steam coal are expected to hold. No change is due in the charge for oxygen.

New League for Business Games

Carnegie Tech Will Open Its Season This Spring

Players will take control of three imaginary companies. Computer will decide who wins.

The college says its game is complex enough to be of real value.—By G. J. McManus.

▪ Is there a short cut for experience in developing business managers? How close can any synthetic experience come to the real thing?

This spring management teams in the executive development program of Carnegie Institute of Technology will play a management game aimed at shedding some light on these questions.

Ground Rules—Carnegie Tech's game turns over to players the management of three imaginary companies. The players decide on production, finance and marketing matters. Decisions are fed into a computer that figures which company was best managed.

The idea is not new. American Management Assn. had a management game several years ago. Westinghouse Electric Corp. can simulate operations of a small company. IBM offers a program along these lines. And there are many others.

At the Helm — Purpose of the games is to give players the feel of company management. The case study approach presents a fixed situation. But management games give a running picture of company life. Decisions are made under a degree of pressure. And the manager has a chance to learn and improve his own performance.

All this has been great fun for the players. Games are played with spirit and interest. And certain benefits are generally conceded. Contestants have gotten what one computer man calls a "spiritual purification." The need to base decisions on overall company welfare has been dramatized and sold.

The Issue — The question is whether management games are detailed enough to provide realistic training. In one system, for example, a player arranges financing by simply turning on the money faucet.

Carnegie Tech set out to build a much more complex game. Ten men worked three months on the basic structure. It took another year to fill in details. Then programmers fed 20,000 instructions and several thousand words of data into an IBM 650.

How It Works—The result is not simple. Instead of a dozen or so decisions every quarter, Carnegie managers are hit with 100 to 300.

Explaining the significance of this volume, Carnegie Tech's W. R. Dill says, "In most earlier games, players simply said how many items they wanted produced. In the Carnegie Tech game the players have to worry about maintenance, overtime policies, hiring policies, raw material purchasing and others. . . ."

The number of new products a team develops is related to the amount spent on research. Prospects for a new product are affected by spending for market research. Accuracy of market dope varies with the amount spent on surveys.

How It Helps — Dr. Dill sees benefits in this complexity. For one, he feels most managers must make both general and specific decisions. Also, the game gives players more information than they can easily swallow. There is pressure for systematic analysis as exists in actual management, Dr. Dill feels.

Gold-Plated Monopoly?

▪ Not everyone is sold on business games.

"Business games are degenerating from an educational exercise to gold-plated versions of Monopoly," charges George W. Bricker, Jr.

Get Serious — The New York management consultant, and former vice president of Cellanese Corp. of America, in a recent issue of the University of Michigan Business Review also predicts the trend will be toward "more serious work by businessmen on the campus."

One fault he finds with business games: "In practice it is how a company spends its money more than the mere amount of money it spends. The games are not designed to take this factor into account."

Gambler's Instinct — Another problem, cites Mr. Bricker: "When played for a number of cycles in sequence the urge to 'beat the game' becomes paramount in the minds of the players."

He admits the games have "limited educational value." But of the more than 50 executive development programs that will be offered this year in the U. S. and Canada he says, "The pace of the programs and the work required is growing year by year. The basic movement has emerged from a cloud of faddism into a solid worthwhile means for raising executive sights and stimulating the thinking of tomorrow's major executives."

How Founders Plan to Improve

They'll Modernize and Expand Facilities

During next two years, the nation's foundries will spend $6.5 billion on supplies, materials and services.

Almost two-thirds of the money will go to modernize. But capacity will also be increased.

▪ Founders are putting more emphasis on modernizing in their new equipment spending. But they are not overlooking expansion.

The industry wants $509 million worth of new capital equipment. And it will spend more than $6.5 billion in the next two years on supplies, materials, and special services.

Where It's Going—Spending for modernization will account for $316 million and expansion for $193 million. According to the survey, modernization will be more important (62 pct of equipment needs). But expansion of capacity will account for 38 pct of equipment needs.

The founders are definite about where and how they want to improve or expand. Typical is the Michigan steel and malleable iron foundry which has already appropriated almost $1 million. About 80 pct will be spent on modernization, the rest on expansion.

Wider Base — The survey also shows foundries are broadening their activities. A major part of the $400,000 to be spent by a large gray iron founder will go for expanded output of aluminum castings.

An Indiana foundry, now in the ferrous field, plans to add aluminum casting facilities and increase its gray iron output. About $300,000 will be spent for expansion, another $100,000 to modernize materials handling, cleaning, and finishing equipment.

As a group, nonferrous founders are more aware of the need to modernize and improve. About 70 pct of their equipment spending will be in this direction.

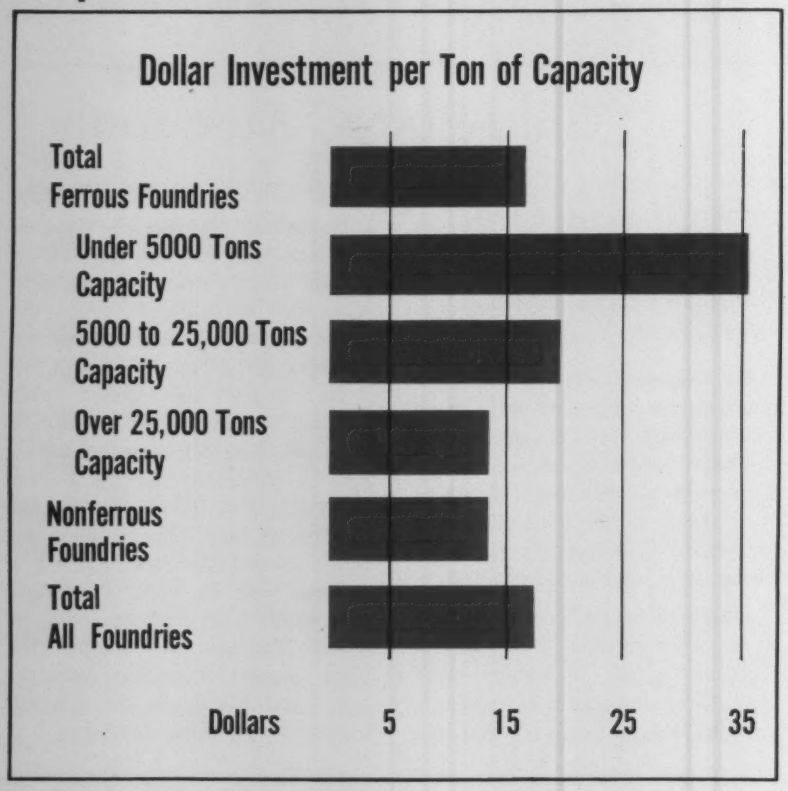
What's Wanted—Among the major items foundries expect to buy are materials handling equipment, molding and coremaking apparatus, melting facilities, and cleaning and finishing equipment. But other needs will not be neglected.

The capital needs of small foundries (per ton of capacity) are greater than those of larger foundries (see table). On the same basis, the needs of ferrous foundries are slightly greater than those of nonferrous foundries. Among all foundries, $17.30 per ton of capacity will be spent. Of this, $10.70 will go for modernization, $6.60 for expansion.

By Size and Product — Among foundries with a capacity of less than 5000 tons a year, equipment needs are estimated at better than $35 a ton of capacity. But foundries with over 25,000 ton capacity average out at $13.50 a ton. Intermediate size foundries (those between 5000 and 25,000 tons) average out at $20 per ton of capacity.

In terms of products, ferrous foundries have greater equipment needs per ton of capacity than nonferrous founders. But when weight of castings is figured, the balance

Capital Needs of Foundries



shifts in favor of the nonferrous producers. Foundries, making both ferrous and nonferrous castings have the greatest needs of all.

Outlook on Output — All foundries, regardless of size, expect better business this year. Average amount of the increase, (according to small, medium, and large ferrous foundries), will be 14 to 15 pct. Beyond this year, larger foundries predict a slightly greater increase in output (22 pct), than medium-sized (21 pct), or smaller foundries (19.5 pct).

The expected trend in output depends on the type of foundry. Nonferrous producers expect a bigger increase in output this year than do ferrous castings producers. The average increases: 16.4 pct for nonferrous and 14 pct for ferrous.

But opinions change for 1961. Ferrous founders look for a 20 pct increase in production. But nonferrous founders believe output will hold fairly even with 1960 levels.

As a whole, the foundry industry is gearing its spending to increased demand for its products. This year founders expect to boost output 15 pct, with another 20 pct increase in 1961.

Spending Plans—An Indiana steel foundry expects to spend $500,000 for improved equipment. An additional $250,000 will be spent on expansion. New materials handling equipment, molding and coremaking equipment and melting facilities will get the major attention.

About $750,000 will go for modernization at the foundry of a large road machinery producer. The foundry division of a machine tool maker needs about $250,000 worth of new equipment, 80 pct of this would be for modernization.

A large bronze and brass foundry will spend $400,000 for equipment this year and next. About 75 pct of this will go for materials handling, cleaning and finishing, sand conditioning, laboratory equipment, molding and coremaking apparatus, and safety and hygiene gear.

Button-Size Crystal Handles Big Jobs

New technique means electronic parts 1000 times smaller, more reliable. Could eventually alter radio and TV design.

▪ A complete radio amplifier no bigger than a button . . . the brains of a huge computer in a cigar box . . . electronic circuits a thousandth their present size . . . and radio sets made automatically from a pool of molten metal. These are some vistas opened up by a startling new concept of electronics.

The potential revolution is based on lining up the molecules in a thin strip of metal in such a way that they do the job now done by a group of transistors, condensers, resistors and connections.

Continuous Ribbons—The metal strips are induction-melted semiconductors; they start off like silicon or germanium transistors. But a speedup in the process of drawing the ingot makes crystals in the form of long ribbon-like dendritic strips.

This startling new concept leapfrogs current efforts to make electronic parts smaller and smaller. "It isn't difficult to see development of a complete communications receiver the size of a pea within a few years." says Dr. S. W. Herwald, Westinghouse Electric Corp. research vice president.

A $2 Million Contract—Westinghouse is working on the project under an Air Force contract. Col. W. S. Heavner, USAF, injects a note of caution. The new technology will probably not replace all conventional electronic components, he says. But he does believe it will satisfy a majority of military and space electronic needs.

Pool to Product—"Eventually," says Dr. Herwald, "we believe it will be possible to automatically and continuously produce actual electronic equipment, such as radio receivers and amplifiers, starting from a pool of molten semiconductor materials."

TINY GIANT: This small molecular electronic unit performs same job as amplifier below it.

RIBBON: A tiny roll of semiconductor ribbon can do the job of units a thousand times its size.

Pipe Leads in Dollar Volume of Steel Imports

Among steel imports more money is spent for pipe and tubing than any other steel product. There has been a marked improvement in both quality and service, and shipments of defective pipe are less frequent. These totals show spending for imports through the first 11 months of last year:

	Dollar Value (in millions)	Net Tons (in thousands)
Pipe and Tubing	$76.8	485,000
Reinforcing bars	64.4	806,000
Structural shapes	63.0	687,000
Wire nails	41.6	274,000
Wire rods	39.7	400,000
Sheet and Strip	33.7	247,000
Round and steel wire	33.4	215,000
Plates	20.5	207,000
Carbon Bars	17.9	187,000
Galvanized fencing	10.2	71,000
Tinplate Products	10.1	52,000
Total all steel imports	443.3	3,852,000

Source: U.S. Dept. of Commerce: AISI

Imports Grab for Buttweld Market

▪ Imports have taken a large part of the market for barbed wire and other merchant products. Now steel mills are wondering if buttweld pipe is just as vulnerable.

Some bleak statistics point up the danger. In the first 11 months of 1959, foreign mills shipped 473,000 tons of pipe into the U. S. While there is no breakdown into different classes, it is believed that most of this was buttweld. According to one steel executive, about 15 pct of all standard pipe sold in this country last year was imported.

The Same Snags—By themselves, these figures might not be too alarming. However, buttweld pipe faces the same cost disadvantage that gave more than half the barbed wire market to foreign mills.

Both merchant wire and buttweld can be made from basic bessemer steels. These low cost steels account for about half the capacity of the European Coal and Steel Community (36.4 million tons). The biggest single chunk of ECSC finishing capacity (24.5 million tons) is for structurals and tube rounds.

Advantages Increase — Foreign mills' cost edge shows up clearly in pipe prices. Before the steel strike, imported buttweld sold for 20 pct below the domestic price. Even during the strike, the import price was 8 pct under the domestic price. Now it's back down to 20 pct below the U. S. mill price.

At the same time, quality and service on foreign pipe has been improved. Shipments of defective pipe are less frequent. And suppliers are taking a more responsible position when they do receive complaints.

What to Do?—Where does this leave U. S. mills? The committee on steel pipe research of American Iron & Steel Institute is looking for an answer to this question right now.

There's little hope for higher tariffs. And pipe producers say they can't cut prices to import levels. So, the question of reducing thickness standards is being studied. "We know we're putting too much steel into pipe," explains a sales executive.

No Adequate Answer—Improved production equipment doesn't seem to offer a solution. Domestic producers admit foreign mills are now on a par with, or better than, U. S. mills. They see no sense in price or product changes because these would be matched by foreign producers and the importers.

However, a token effort is being made. In the next few weeks, U. S. mills will begin labeling buttweld with the name of the company and the words "Made in U.S.A."

Dulling Europe's Edge — When the program has been put into effect, mills will ask that foreign pipe be identified in a similar manner. There is a vague hope that the prestige of U. S. production plus patriotism may work in favor of the domestic product. But no one really thinks an emotional appeal is going to offset economic factors.

Make Overhead Conveyors Pay

They Can Be Used for More Than In-Plant Movement

Usefulness of overhead material handling systems can be doubled by using them for more than storage.

It takes planning, but they can often be integrated into production lines.

▪ Overhead material handling systems are now becoming an actual part of processing rather than an accessory, says a leading Cleveland authority.

"Our ratio of engineering hours per dollar of sales has doubled since World War II," says Lester Fell, vice president of marketing, American Monorail Co., Cleveland, and newly elected president of the Materials Handling Institute.

On the Ground Floor—"We are now getting into original layouts of plants and are brought in with the machinery suppliers, heat treating furnace builders, forging machine firms and others to determine rates, placement of machines and other layout factors. It used to be that we just laid the tracks between existing machines. Conveyors were just a part of the in-plant movement or storage rather than integrated with manufacturing process," he notes.

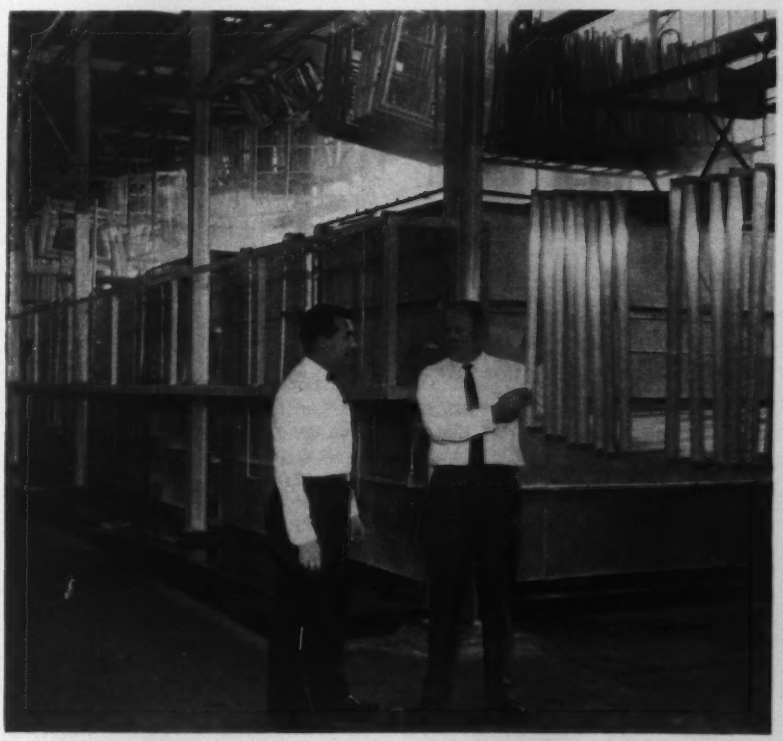
"Material handling systems now probably represent 10 to 20 pct of the machinery investment in a plan, compared with 5 to 10 pct right after World War II."

Advanced Installations—One recent aluminum plant installation at Reynolds Metals in Louisville, Ky., approaches a railroad switching yard in complexity. It has semi-automatic switching of 400 lb baskets of parts between several pick-up and receiving areas and includes immersion in 15 dip tanks. The layout is considered one of the most advanced of its type with overheads, underpasses, crossovers, track switching and automatic time delays.

In Chrysler Corp.'s automotive forge plant at Detroit, crankshafts go through several cycles automatically without manual handling. Stages include heating, forging, cooling, heat treating and finishing at about 400 parts per hour. At an Ohio stamping plant, conveyor systems have even been tied in with a computer system that determines which and how many blanks go to each machine. Blanks are automatically picked up, stamped and stocked.

Engineering Saves Money—"This is a far cry from a couple of sections of track around a plant," says Mr. Fell. "We used to have a total engineering staff of three people—an engineer, an assistant, and one draftsman. Now we have a chief engineer, project engineers, and mechanical, electrical and structural engineering specialists. Because we get into original layouts, our lead times are up to a year on some jobs. With more engineering, too, standardization is becoming a more distant goal because specialization can save so much money.

"On the forging installation for Chrysler, for instance, supplier meetings were set up beforehand. Limiting factors on speeds, machine placements, conveyor feed and discharge rates, accumulation centers and similar factors were determined before building measurements were worked out," explains Mr. Fell.



CONVEYOR CONVERSATION: Industrial engineer D. J. DeLisle (left) and plant superintendent J. M. Monohan discuss loading of frames on overhead conveyor at Reynolds Metals Co., Louisville, Ky., plant.

How Strike Hit Steel Earnings

Profits Dropped, But Record 1960 Is Likely

Steelmakers are picking themselves up after the strike and are working at a record rate.

They hint they can work with the new contract and imply worker help in improving productivity.—By R. D. Raddant.

▪ The 116-day steel strike made a recession year for the steel industry out of 1959.

But for the most part, steelmakers were able to salvage some profits in spite of the industry's most costly strike.

First Half Surge—In effect, the strike cost the steel industry, and its workers, about one third of the year. But because of a highly profitable first half, when steel users built up record inventories, the major steel producers were able to maintain their regular rate of dividends. Most were able to show a modest profit. (See table.)

Five of the major companies showed improved profits over 1958. Of these, National Steel Corp. and Armco Steel Co. operated a large part of their capacity throughout the strike and made significant gains over 1958.

Good Outlook — The strike-hit earnings of 1959 are tempered by the good outlook for 1960. The industry is now operating close to capacity. Even the pessimists concede a record steel output for the year and some hope for record profits.

Bethlehem Steel Corp. for example, has orders on hand for 5,074,887 tons of steel, a record backlog for the company. Arthur B. Homer, Bethlehem president, said his company would operate at 100 pct of capacity in the first quarter, in the 90's in the second, into the 80's in the third, with a rebounding in the fourth. He predicted the industry would produce 130 million tons of ingots this year. This compares with the previous record of 117 million tons in 1955.

Contract Potential — Most steel leaders echoed optimism, but with some reservations. Biggest single problem for the year is living with the new labor contract. The industry now puts the figure at about a 3.5 pct increase in labor costs. But most executives hint at expected improvement in productivity, with worker and union cooperation, durthe new contract.

Degree of optimism for 1960 varies, however. Chairman Roger M. Blough of U. S. Steel, for example, predicts that a full 20 pct of steel output today is going into inventory buildup. Mr. Homer sets the buildup at between 10 to 15 pct. Mr. Blough puts 1960 output at 120 million tons, 10 million tons under Mr. Homer's estimate.

Comeback Varies — The fourth quarter 1959 reports also reflect varying success in getting back into operation after the end of the strike. Some companies were able to show good earnings in the fourth quarter. For others, the strike's end came too late for the fourth quarter to show more than moderate profits.

Most leaders in the industry, after first registering pain and anguish at the steel settlement, now indicate they believe they can work with it.

For the most part, they would like to forget about 1959 except that they feel they fought the good fight to stem inflation.

With modest profits in 1959, and possibly the best year in history ahead, the attitude is that it could have been worse.

Steel Earnings: 1959 Vs. 1960

1959 Could Have Been Worse

COMPANY	1959 Earnings	1958 Earnings	1959 Fourth Quarter
U. S. Steel	$253,975,686	$301,558,231	$30,162,326
Bethlehem	117,235,859	137,741,946	33,003,943
Republic Steel	53,890,116	61,921,680	11,661,805
Jones & Laughlin	29,485,000	23,198,000	3,744,000
National Steel	54,897,360	35,827,414	12,614,652
Youngstown Sheet & Tube	30,956,040	21,501,320	9,400,895
Armco	76,849,803	57,512,151	17,403,839
Inland	48,354,030	47,869,042	13,630,758
Wheeling	7,033,000	8,899,000	285,000
Pittsburgh Steel	.....	866,000*	.....
Granite City	16,142,000	9,374,000	.....
Copperweld	5,972,457	2,081,114	1,789,971
Colorado Fuel & Iron	4,364,554	2,147,223	1,999,729
Alan Wood	4,856,000	2,109,000	1,774,124
Crucible	6,106,443	4,274,793	480,528*

* Indicates loss.

AT STEEP ROCK: In spite of general ore problems, Inland Steel's subsidiary, Carland Ore Co., will soon be mining high grade ore underneath former lake. Dredging job took five years to complete.

Domestic Ore Fights for Life

Lake Superior ore is battling against the great inroads of foreign ore.

Domestic oremen claim foreign ores are getting price advantages and hit at Minnesota tax structures.—By T. M. Rohan.

■ Lake Superior ore is now fighting for its life against the inroads of foreign ore. To make matters worse, foreign ores are getting a special break from low cost foreign ships, favorable rail rates within the U. S. and absence of built-in inflation.

This hard-hitting and admittedly gloomy analysis was given recently by John S. Wilbur, sales vice president, Cleveland Cliffs Iron Co., Cleveland, at the 21st annual mining symposium of the University of Minnesota.

Aroused Interest—R. W. Whitney, president, Hanna Mining Co., Cleveland, was more optimistic, but decried the Minnesota tax structure. These speeches have aroused considerable interest in mining circles. They have depressed stock market prices of mining firms. But it is hoped they will cause review by taxation agencies and transportation firms.

Cleveland Cliffs and other firms are also in a major upgrading program. The Erie and Reserve Mining Co. taconite plants and Cleveland Cliffs own beneficiating plants in upper Michigan are a part of this.

Strike Hurt—Foreign mines were quick to cash in on the 1959 U. S. steel strike. They shipped in so much ore that the Lake Superior districts' share fell to 47 pct of the total last year—way off from the traditional 80 pct of a few years back.

Mr. Wilbur said the steel industry move in the 1950's to "supplement" their domestic ore reserves with foreign deposits is now coming back in a wave to where Lake Superior ores will soon become significant only in big steel years.

Other highlights were:

Russia will begin shipping several million tons of ore to Japan in the early 1960's.

Greater Tonnages — Lake boats are held to about 25,000 tons capacity while ocean bulk ships of 50,000 tons are in operation. And 70,000 ton capacity ships are on the drawing boards. These can cut shipping costs drastically.

The St. Lawrence Seaway is permitting eastern Canada and foreign ores to move competitively into Ohio, Mr. Wilbur said. Some moved to Detroit and now Inland Steel is going to bring Labrador ore to Chicago. Granite City Steel brought ore up the Mississippi. Republic Steel brought it all the way from India up the same river to Chicago.

Eastern railroads are indifferent to the miners' plight and give favorable rates to foreign ore from the East Coast. The Lake Superior district's negotiating power is "nil" because it can go only one way. Ore from the East Coast moves to Youngstown at a third the rate per ton-mile than from Ashtabula, O.

Rate Difference — The rate for 424 mi from Philadelphia is $3.92 or 10 mills per ton-mile vs. $1.97 for the 59 mi from Ashtabula or 33 mills per ton-mile. Foreign mines also can play seaway ships and railship systems against each other and get low rates. Some are only 7.4 mills per ton-mile, such as from Contre Coeur to Pittsburgh. This is only one third the ton-mile rate from Lake Erie points to Pittsburgh. Foreign ores are richer too, so their advantage increases when figured on an iron unit basis.

New Lab Opened by Arco

▪ A new research and quality control laboratory has been opened at Latrobe, Pa., by the spring and forge division of Arco Products, Inc.

The laboratory will be used for research in steel making technology and to help maintain quality control of steel forgings produced at the firm's Latrobe plant. It will also be used for quality control functions on openhearth steelmaking and heat treating.

Equipment includes: A 300 lb ingot induction melting furnace for alloy development, a Leitz research dilatometer for thermal analysis, creep-test machines, a furnace for high-temperature mechanical testing and four Navy-type roller machines for testing surface wear and abrasion resistance.

Trade Talks Are Off Again

Russian and U. S. efforts to clear present blocks to increased East-West trade have broken down again.

The U. S. broke off talks when the Reds refused to settle World War II lend-lease debts unless this country lifts present bans on exports and credit to the Soviet Union. The U. S. insists legally and morally we cannot negotiate any tariff or quota lifting until the lend-lease debts are settled.

Talks followed Premier Khrushchev's visit to this country. The U. S. insists on some settlement, even partial, of the $1.3 billion in lend-lease debts owed us.

The Reds insist they won't talk about the debt until we make some trade concessions. The U. S. lent Russia $10.7 billion in military and civilian goods during the war. All but $1.3 billion was written off. Russia offers only $300 million. The U. S. has insisted on at least $800 million.

Tyson Bearing Co. Expanding Plant

A $2 million expansion program, designed to increase tapered roller bearing capacity, has begun at the Tyson Bearing Co., Massillon, O.

Expansion will enable Tyson, a division of SKF Industries, Inc., to almost triple production. Completion of the project is expected by July.

This marks the third plant expansion for Tyson in the last 18 months. Bearings produced will be used for heavy farm equipment, earth moving vehicles, buses, tractor-trailer trucks and medium industrial machinery.

New Labor Agreement For Pittsburgh Steel

Pittsburgh Steel Co. and the United Steelworkers have reached agreement on a new labor contract.

The memorandum of agreement, reached last Friday, calls for a two-man committee to work out incentive problems. The incentive issue was the prime stumbling block in the way of a new contract.

The company lost a Taft-Hartley election vote on its final offer by a margin of 2 to 1 in mid-January. Since then, operations have continued under a contract extension.

Both Pittsburgh Steel and the union now say agreement has been reached on all major problems.

National Computer Start of a Trend

A new trend in steelmaking techniques broke into the open last week when National Steel Corp. revealed plans for computer controls on a hot-strip mill.

Slated for National's Great Lakes Div. at Detroit, the new system will be "the largest of its kind applied to a rolling mill."

The computer will provide supervisory control of mill and furnace adjustments. It will store and analyze data.

Daystrom, Inc., is supplying the strip mill computer. A second electronic device will be used for data-processing at Midwest Steel, National's new mill near Chicago. Westinghouse Electric Corp. is providing equipment for the mill.

Word of these installations is the first public acknowledgment of the development which is getting wide atention in steel circles.

No one is exactly sure at the moment what functions computers will handle in steel production. Initally, the machines will be used to a large extent for storing and analyzing data. As more experience is gained, programs will be devised to be used for direct control.

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"Costs less to operate"

There's less to do, less to learn and less to go wrong. Never even have to worry about damaging the machine by forgetting to change the knife clearance. Once set, Niagara Shears need no further adjustment. "Been using Niagara's for 10 years . . . never had downtime for repairs or maintenance," says another user. Even after long, hard use when it becomes necessary to turn the blades or change knives, it's a very easy matter. Nothing like Niagara Shears for simplicity.

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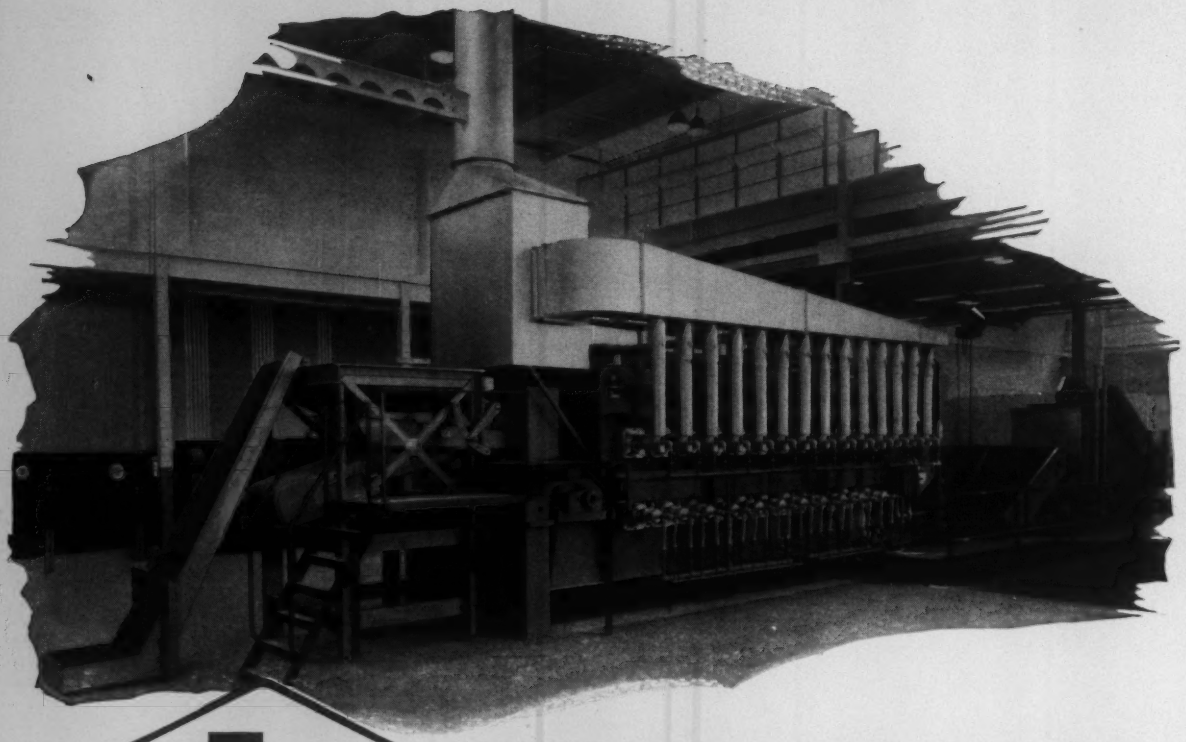

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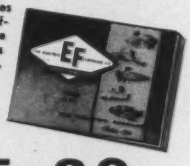

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Prof. Frank K. Shallenberger

From Classroom to Foundry

With the aid and interest of his engineering students, Prof. F. K. Shallenberger built a new business.

Now it has grown to be one of the leaders in the shell molding field.

PROF. F. K. SHALLENBERGER: Classroom interest built a business.

▪ Eight years ago a group of Stanford University Business School students and their teacher became interested in the then little-used process of shell molding for foundries. To their surprise they could find no Western foundry using the process—mostly because commercial molding machines being sold were costly, high production units. So the students built their own machine from spare parts scrounged around the foundry lab and in town.

Foundrymen came from miles around to see the machine. Many wanted to make or buy one like it. The students and their teacher, Prof. Frank K. Shallenberger, put up their own money, got outside backing and went into business building them. The low cost versatile machines put many small foundries into new business with better products.

Seminar Subject—Shalco Corp. —named for Prof. Shallenberger— grew until today it employs 60 persons and is a top competitor in the field. Shalco has provided a continuing management case for class study in Shallenberger's Seminar in Small Business.

The product has grown from simple manual equipment to fully automatic core blowing machines used in high production foundries in electrical, automotive, pipe and fittings industries. For example, Shalco core blowers are currently producing cylinder blocks, manifolds, and transmission castings for compact cars.

Growing Pains — There were growing pains, of course: Limited finances, developing a strong organization, transmitting know-how to customers, continual refinement.

The technology of shell molding has developed rapidly—shifting emphasis from shell molds to shell cores, use of resin-coated sands, increased automation, new techniques of producing and using shell cores.

World-Wide—Shalco equipment operates in practically every industrialized country in the world and in every major metalworking industry. Distribution has been through Shalco's own sales force.

Last summer, Shalco's 30 stockholders, including the original students and key employees, decided that the predominantly eastern market was larger than Shalco could properly serve with its limited finances and its small plant in California. Last month Shalco joined forces with National Acme of Cleveland. They believed the combination of Shalco's designs, personnel, and shell molding know-how and National Acme's 75 years of experience in building precision automatic machine tools would mean continuation of Shalco's high position in the growing shell molding market.

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Why Business Financing Is Tough

Tight money and rising costs are not making the problems of small business financing any easier.

As a result, experts say, many privately-held companies will "go public" in the next fifteen years.

▪ Financing a business is never easy. These days with tight money, high interest rates, rising costs and wages, it's more difficult than ever.

If your company is medium sized or small, you know the problem is especially tough. Such companies cannot stand still—they must expand or lose out. The result: A continual need for working capital. Financing troubles can wreck a company even when its management is sound.

Private to Public—Experts took a look at these problems last week in New York during an American Management Assn. briefing on equity financing. One speaker—Robert A. Weaver, Jr., president of the Bettinger Corp.,—forecast more small companies will be going public by 1975. He predicted some 30,000 businesses now in private hands will be publicly-owned corporations by then.

Actually, Mr. Weaver pointed out, there are about 150,000 companies which are likely candidates for public financing. They are "all companies with over $250,000 in assets . . . and about one-third of those with between $50,000 and $100,000 assets."

Holding Back — Until now, he noted, small business hasn't joined in the sharp increase in capital financing of recent years. Why? "The traditional fear of going public on the part of the small businessman, and, in so doing, losing control of his business."

In the past, according to Mr. Weaver, even if the small businessman made overtures he didn't put his best forward with the bankers. And the bankers, in turn, were sometimes reluctant to take on small issues because of the high cost of financing involved.

However, this situation is changing. Banks are now more aware of the needs of small business. And small business managers are becoming more alert to what investment bankers can do for them.

Market Attractions—Some types of business find it easier to attract investment capital in the money market place. Another speaker—John Clark, Arthur D. Little, Inc.,—listed some of these as electronics, hydraulics, plastics, those related to medicine and health, and those with a high technical and science content. The reason: The attractive long-term growth prospects of these companies and industries.

Construction Spending Lags

▪ With the economy in high gear, the pattern of construction spending still remains a puzzle.

You'll recall that construction—together with inventory rebuilding and consumer buying—is counted on heavily to keep the boom rolling. Construction is expected to take up some of the slack when the inventory buildup starts to wane.

Lag in Late '59—But lately, construction spending hasn't been impressive. In its latest reports, the Dept. of Commerce calls construction "one of the few major areas of lagging demand."

Through December, it had not gotten back to the highs of last spring. Tight money apparently was hurting private housing starts. Public construction was lingering below the spring's peak because of declines in roadbuilding, schools, and public housing.

Some Rally, But—As the year closed there were some gains in December. Private housing starts (on a seasonally adjusted, annual rate) were 1.3 million, up from the 1.2 million of November.

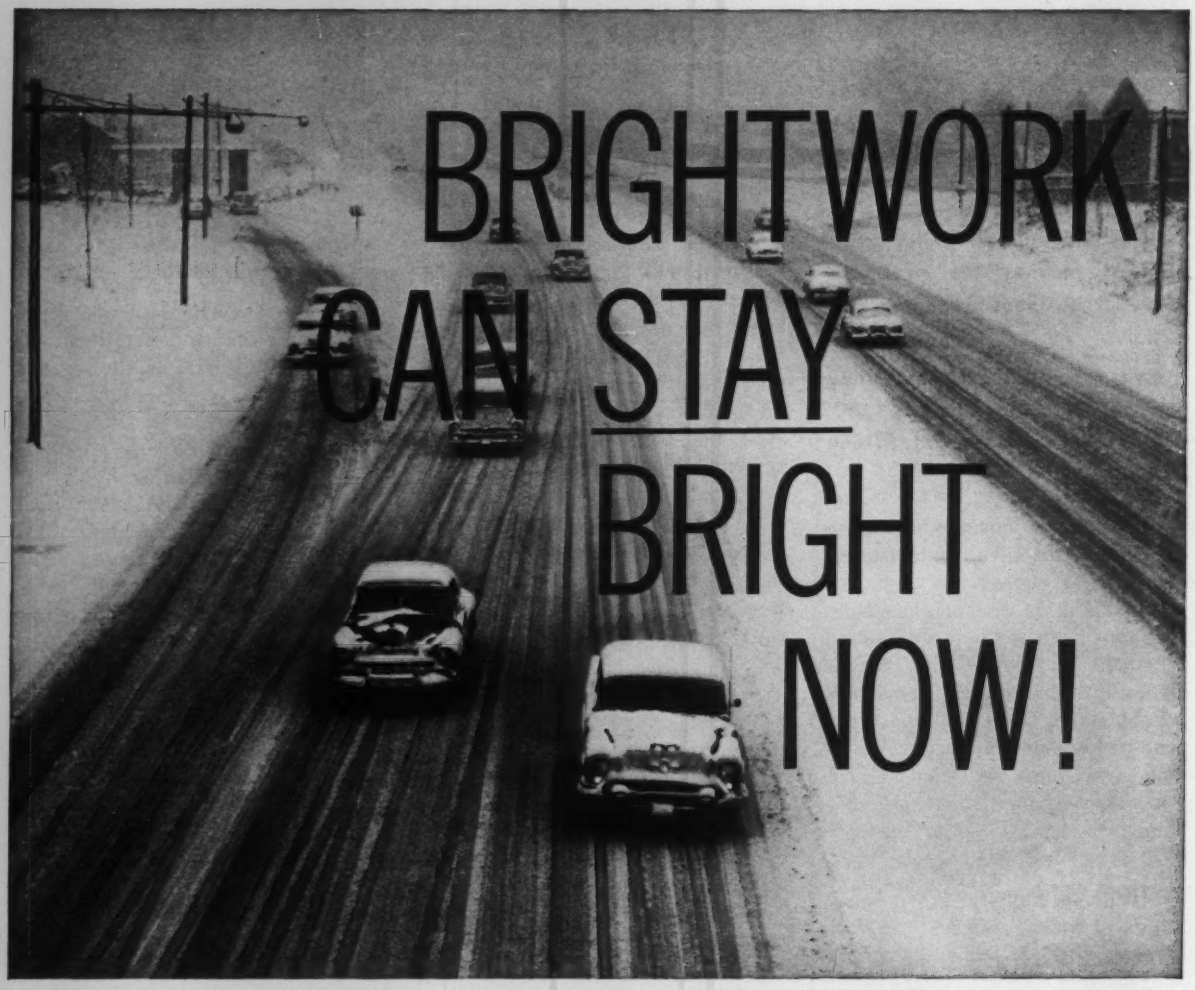
But, overall, construction in the fourth quarter was 7 pct below the spring high. And it was 5 pct lower than the total for the entire year of 1959.

Incomes Rise, But Less Is Saved

Incomes are rising, but consumers are spending the money—and also borrowing.

Almost all of the added disposable income since 1956—some $40 billion—has gone into consumer markets, says the Dept. of Commerce. As a result, there's been a drop in the percentage of consumer income put into savings.

In only two years in the last decade was personal saving any lower than it was in 1959. The others: In 1950 at the start of the Korean conflict and in 1955 when car financing was heavy and installment credit terms were liberalized.



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COMET: First medium-compact car on the market, Ford's Comet is bigger than Falcon, smaller than Ford.

Ford Ready to Launch Comet

Coming in the months ahead: The biggest small cars in the world.

First is Ford's Comet. But several others will follow soon after.—By A. E. Fleming.

▪ Ford Motor Co.'s Comet will be the first of a series of new-size cars the automobile industry will introduce this year.

The medium - compact Comet (bigger than small-compacts but smaller than standard-size models) will go on sale in Mercury showrooms March 17.

Getting ready to come out with versions of the medium-compact by 1961 model introduction time or sooner are Dodge, Buick, Oldsmobile and Pontiac.

What This Means—Like the arrival of the Big Three's Corvair, Falcon and Valiant last fall, the coming of the medium-compact is significant. It carries one step further the evolution to smaller models of all makes in all price classes. Even Cadillac, noted for opulence, is working toward this end.

The Comet is much akin to the Falcon, Ford's small-compact. They have the same body shell, and the same 90 hp engine. Because of this interchange of components, the difference in price between the two will be small.

Dodge's medium - compact and the Valiant will also be fraternal twins. So will the smaller Pontiac and the Corvair. Buick and Oldsmobile, however, will avoid all Corvair fixtures in favor of greater individuality.

An Indication — Roughly, the Comet provides an idea of the size of the medium-compacts in relationship to the small-compacts and the conventional Chevrolets, Fords and Plymouths.

The Comet, like the small-compacts, is nearly stripped of exterior body trim. There's a slim slice of chrome along the upper part of the front fenders and doors, and atop the rear fenders. And the grille is anodized aluminum.

Your Choice—The car comes in four body styles: two-door sedan, four-door sedan, two-door station wagon and four-door station wagon. Front fenders are bolted on for easier, cheaper replacement. It has ball joint suspension in front, leaf springs in rear.

Comet production will start Feb. 15. One plant at Lorain, O., will assemble. Output will average around 2000 cars a week the first six to eight weeks. Current weekly schedules for other compacts: Falcon-11,000; Rambler-10,500; Corvair-9000; Valiant-4500; Studebaker-3500.

Output Outlook — With Comet assisting, compact car output will spill over the half million level in the first three months of 1960. This includes Rambler and Studebaker besides the Big Three compacts. At this rate, compacts will account for 20 to 25 pct of total car production for the period. The share will rise as other compacts sprout up later this year.

The small Buick and Oldsmobile

will pack the most power. Under development are new V-8 engines that will make more use of aluminum. Horsepower will at least equal, and probably surpass, present six-cylinder engines of the standard Chevrolet (135 hp), Ford (145 hp) and Plymouth (145 hp).

Compare — Buick and Oldsmobile's medium-compacts will be close to the Ford Thunderbird in wheelbase (113 in.) and length (205.3 in.). Pontiac's compact, using the Corvair body shell, will be smaller than Buick and Olds. Corvair's six-cylinder aluminum engine, or an adaptation, figures in Pontiac's plans.

The little Dodge will have a wheelbase slightly smaller than Buick and Olds. Power will probably come from the 148 hp six-cylinder engine that will soon be available as an option on Valiants.

What Builds Sales—Evidence is piling up that power and performance will play a greater role in the competition for compact car sales.

Rambler is putting more punch in its 100-in. wheelbase American, the model that vies with the Big Three small models. The American can now be purchased with a 125 hp six-cylinder engine, similar to the one used in the 108-in. wheelbase Rambler Six. Americans with the bigger engine are called the Custom line. Deluxe and Super Americans will continue to offer the 90 hp six-cylinder engine.

Rambler in Canada

American Motors has decided that demand for the Rambler in Canada has risen to where assembly in that country is practical. Rambler sales in the Dominion in 1959 were up 73 pct over 1958.

Production will start this year, under E. K. Brownridge who has been named executive vice president and general manager of the Canadian operation.

New Diesel Line Will Use More Aluminum

International Harvester is making a new line of diesel trucks in which aluminum is used extensively. The aim: Reduce chassis poundage. The models have gross combination weight ratings to 79,000 lb.

Aluminum replaces steel and other metals in steering gear cases, engine mounting brackets, cab hinge brackets, battery box and cover, and many other basic units. Optional aluminum parts include bumpers, transmission housings, clutch housings, top and bottom radiator tanks, frame siderails and cross members and gussets.

Interest in diesels has been growing. Sales of diesels set a record in 1959 and are expected to be higher in 1960. Almost half the sales of heavy-duty trucks are diesels.

A sign of optimism: Dodge came up with a line of diesels last fall; Ford will follow suit next fall.

New Glass Laboratory

Ford Motor Co. plans to set up a glass research and process development center in Lincoln Park, Mich. It will be housed in a building now serving as the Tractor and Implement Div.'s Detroit regional sales office and parts depot. A new building for T&I is going up near Birmingham, Mich.

Chief aims of the glass laboratory will be to help Ford keep pace with the technological improvements being made in the glass industry, and to apply new processes to automotive use as soon as possible.

U. S. Automakers Gain In Foreign Car Boom

The U. S. auto companies are starting to get a bigger share of the foreign car boom in this country, says the U. S. Dept. of Commerce.

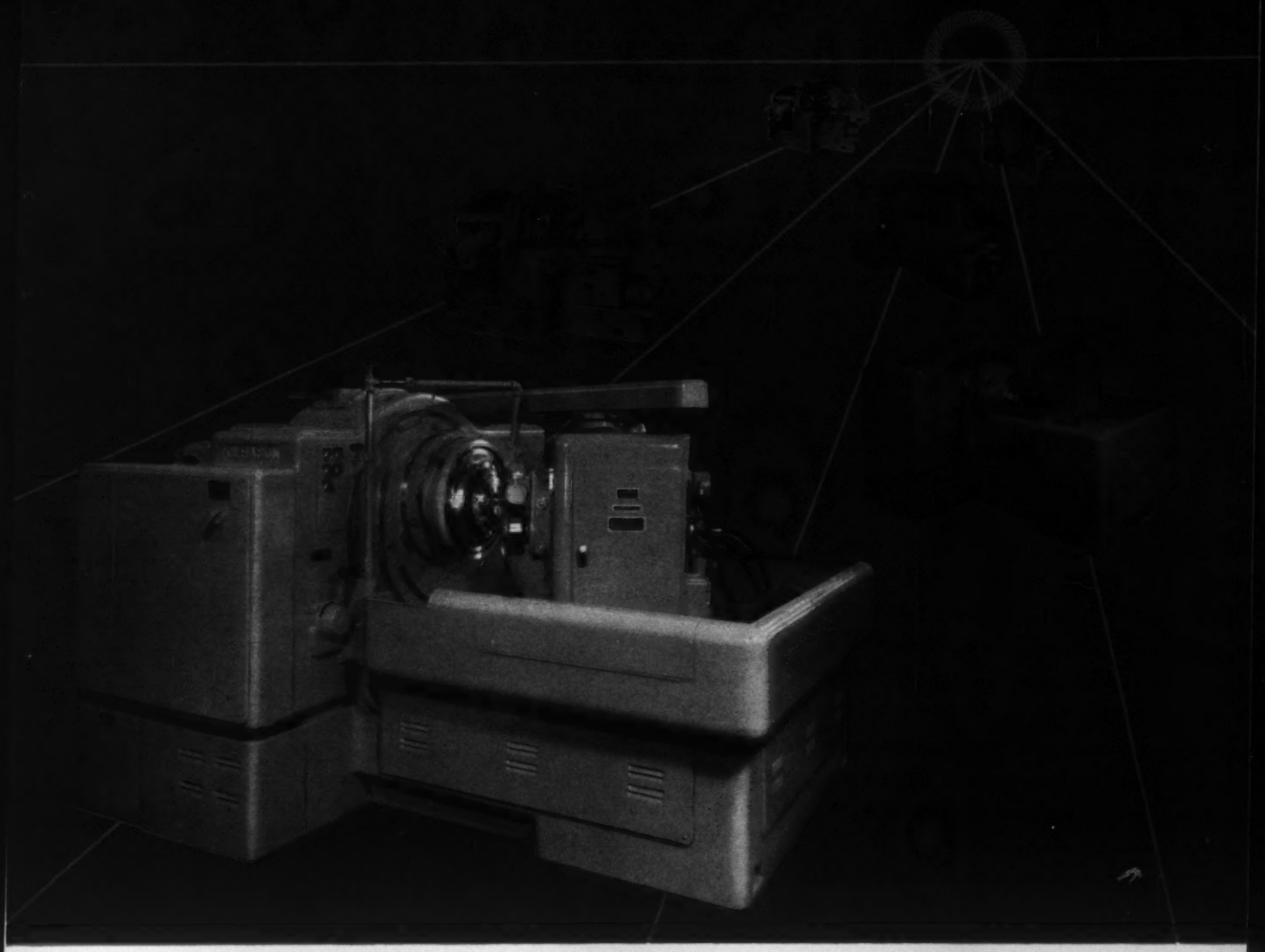
Imports of cars made in American-owned plants abroad leaped 224 pct in 1958 over 1957, says a Commerce report. Figures haven't been completed for 1959. Indications are the trend will continue, but at a slower pace.

Leading the Race—Despite the huge increase—U. S.-owned foreign companies still account for only 28 pct of the cars imported into the U. S., Foreign owned companies—Volkswagon, West Germany; Renault, France; Fiat, Italy; Hillman, Triumph and MG, England; Volvo, Sweden—account for almost all the rest.

Foreign cars, from both U. S.-owned and foreign-owned companies, continue to increase their share of the U. S. market. Sales have moved from 57,115 cars in 1955 to 433,921 in 1958. In 1958 this was eight pct of the market. Preliminary figures indicate they hit nine pct in 1959.

Between Falcon and Ford

	FALCON (Small-compact)	COMET (Medium-compact)	FAIRLANE (Standard)
Wheelbase	109.5 in.	114.0 in.	119.0 in.
Length	181.2 in.	194.9 in.	213.7 in.
Width	70.0 in.	70.4 in.	81.5 in.
Height	54.5 in.	54.5 in.	55.0 in.
Weight	2288 lb	2411 lb	3706 lb
Trunk Area	23.7 cu ft	26.6 cu ft	33.5 cu ft



Now . . . one machine does the work of five!

For small production runs—here's *one* gear-cutting machine with the flexibility of *five!*

The Gleason No. 118 Hypoid Generator roughs and finishes both gears and pinions—using four cutting methods that formerly required a battery of five machines. When production requirements increase, you simply add other machines, the 118 becoming a specialized member of your production team.

1. Single-Cycle® Method. Using this method, you can cut nongenerated gears four to five times faster than previously possible on machines of this type. Cradle and work head are locked in position. The last rotation of the Single-Cycle Cutter finishes both sides of a tooth space. You cut the mating pinions on the same machine, using the conventional single-roll generating method.

2. Cyclex® Method. For certain applications you can use the extremely fast Cyclex Method on the No. 108 Generator. You cut nongenerated gears in one completing operation from the solid blank.

3. Generated Gears and Pinions. You can produce both gears and pinions on this machine with the generating method. Here, a relative rolling motion takes place between gear or pinion and the rotating cutter. Once the gear is chucked in the work head, the machine operation is entirely automatic.

4. Unitool* Method. If you want to cut small quantities of spiral bevel, Zerol® bevel, or hypoid gears with a minimum of tooling, you can use the Unitool Method. You cut both gears and pinions with a single cutter. This method is particularly useful for experimental gears for prototype work.

*Trademark

The No. 118 Hypoid Generator handles gears up to 18″ diameter at a 10:1 ratio, to a *maximum* coarseness of 2 DP. For production of smaller gears, the No. 108 Generator cuts gears up to 8½″ diameter at a 10:1 ratio and to 4 DP. A third model, the No. 28 Hypoid Generator, cuts gears up to 33″ diameter at a 10:1 ratio, 1½ DP.

For complete information, send for bulletins on all three machines.

GLEASON WORKS

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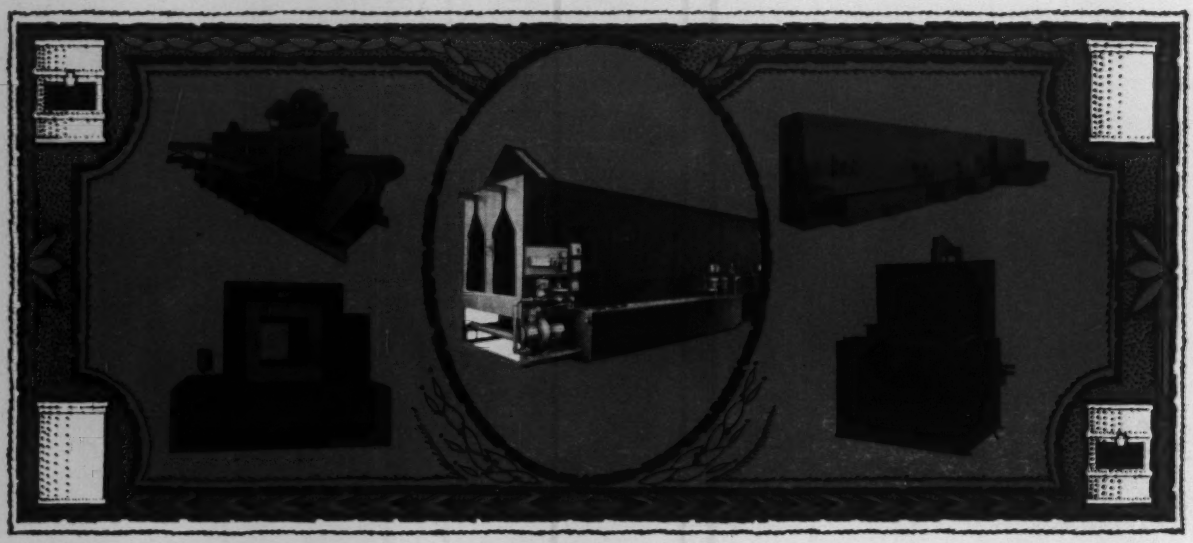
HOW WELL

are you investing metal finishing dollars?



If you're running a medium-sized appliance manufacturing plant, you probably spend about $100,000 a year on chemicals to prepare metal surfaces for finishing. And you're using these chemicals in automatic equipment that may have cost you two million dollars or more.

The secret of getting the most out of your investment is to make sure your machines and chemicals are *working together* as they should. This is what you get when you take advantage of Pennsalt's System Approach to metal surface preparation.

Because Pennsalt supplies complete lines of both chemicals and equipment, we can treat your metal finishing line as an *integrated system* . . . make your investment pay off in high-speed production, top product quality and low cost per unit. We make sure you continue to get top performance too, through the Pennsalt Metal Preparation Service Plan.

We'll be happy to show you how this approach can make your metal finishing dollars work harder. Write for free booklet 309, "The Pennsalt Metal Preparation Service Plan".

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Washers of all types
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Coal Industry Wants New Agency

It Wants Steps Taken to Set Up Fuels Policy

The coal industry wants a new research and development agency to study fuels problems.

But opposition is coming from the natural gas and oil industries.—By G. H. Baker.

▪ Coal industry efforts to get Congress to set up a special coal research and development agency are igniting some blazes on Capitol Hill. The industry wants the agency to take the first steps toward setting a national fuels policy.

The coal industry is asking for a new division to be set up within the Interior Department. And it wants it to operate with a $2 million a year or so appropriation. This is similar to a measure vetoed by the President last year because it would have created an independent coal agency.

Proposed Duties—The proposed division would conduct a research program on coal marketing, producing, utilization, coordinate existing private coal research and collect and distribute figures on coal research.

In addition, the industry wants a special Senate-House committee created to study fuels resources—coal, oil, natural gas, and atomic energy. After studying the fuels problem, the committee would then recommend a national fuels policy.

The Opposition—It is this national fuels policy proposal that's causing the furor. Natural gas and oil industries complain bitterly that the coal representatives are trying to enlist government aid in restricting uses of gas and oil to help restore lost coal markets. The coal industry argues that controls are needed to prevent waste of natural resources.

Russia May Try To Extend Rule

Because of success in exploring space, Russia is in a cocky mood. And it may be ready to extend its rule to new areas of the globe, a top Administration official predicts.

George V. Allen, director of the U. S. Information Agency, believes there is "real danger" that the U.S.S.R. rulers are in an "adventuresome" frame of mind. He fears they may be ready to grab new territory. If so, "the world is in for a good deal of trouble," he tells a congressional committee investigating U. S. progress—or the lack of it—in exploring space.

What's more, the Russians have planted the belief in Western Europe and in other areas that U. S. space studies are a flop, he says. And they are claiming that it is next to impossible for the U. S. ever to catch up with the U.S.S.R.

Convention Expenses Are Tax Deductible

Convention expenses, whether or not reimbursed by an employer, are tax deductible if the convention is an honest business activity.

The Internal Revenue Service reminds businessmen that all transportation, travel, and convention expenses, which it notes are "usually substantial," are tax deductible if the convention is legitimate.

Doolittle Calls for Decisions

▪ The United States will have to make the right technological and policy making decisions during the 1960's if we are to remain world leaders, says Gen. James H. Doolittle.

"I believe we have to make some hard choices in the next decade concerning what we as free people want to do with our talents, our technology and our time," Gen. Doolittle, chairman of the board, Space Technology Laboratories, told top administration officials and business-magazine editors recently.

Annual Award—Gen. Doolittle received the 1960 Silver Quill award for distinguished service to business at the annual meeting of National Business Publications. The IRON AGE is a member.

Gen. Doolittle now believes national leaders must soon select certain priorities to guide U. S. economic and military decisions in the years immediately ahead. But he opposes all proposals for a "military economy."

The Necessities—He warns that it is necessary to work hard and produce much if the national economy is to match another nation's that is "all out for space."

It is clear, he says, that Russia can outdo the U. S. in selected fields, by investing more resources in a particular activity. But, he says, we can still outdo them in any field of endeavor if we concentrate enough of our human and material resources on a specific goal.

Better than New!

View of mill housings in process of re-machining

This Five Stand Tandem Hot Finishing Mill has been in use for many years in the Pittsburgh Area. It is being completely modernized with the latest design features including automatic screwdown, improved anti-friction roll neck bearings, etc. Then the original mill, in better than new condition since equipped with these modern features, will be operated in the Chicago District for many future years of competitive service in the steel industry.

As Builders of Rolling Mill Equipment, we will be pleased to quote on your requirements for re-built or new installations.

"Electric and open hearth steel castings from 1 lb. to 100 tons"

HEAVY MACHINING FACILITIES

Our plant is equipped with a superior complement of well diversified machine tools that are available on a continuing basis for economical machining of heavy castings or the manufacture of auxiliary rolling mill equipment, such as heavy mill tables, furnace pushers, slab depilers, downcoilers, ingot buggies, slab transfers, etc.

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Aircraft Makers Try a New Look

They Diversify to Avoid Soft Spots in Markets

Farwest planemakers are finding ways to avoid their industry's sales peaks and valleys.

They are moving into other types of work, and forming ties overseas.—By R. R. Kay.

▪ Farwest aircraft companies are taking on a new look.

During the next few years, they'll resemble planemakers less and less—industrial firms more and more. In fact, Northrop has already dropped "Aircraft" from its corporate name.

The aircraft industry, with its peaks and valleys, never could count on stable profits. The natural thing to do: Move into other fields.

Wider Interests—And that's exactly what it's doing. The major aircraft firms on the West Coast are now heavily in shipbuilding, general construction, electronics, avionics, atomics, industrial equipment, and communications.

And something new has been added: The international look. Planemakers are strengthening their positions all around the world. How? They're tying in with foreign firms.

Overseas Ties—Here are some recent moves:

North American Aviation and a French firm set up a company to design, build, and market nuclear reactors. Named Dynatom, the company will sell in France and the French Union.

Lockheed Aircraft bought a big piece of Italy's Aeronautica Macchi, S. A. The move gives Lockheed a bigger footing in the growing European market.

The Italian firm will make a new Lockheed-designed light utility plane. It's an all-metal, high-wing transport for six persons or a half-ton cargo.

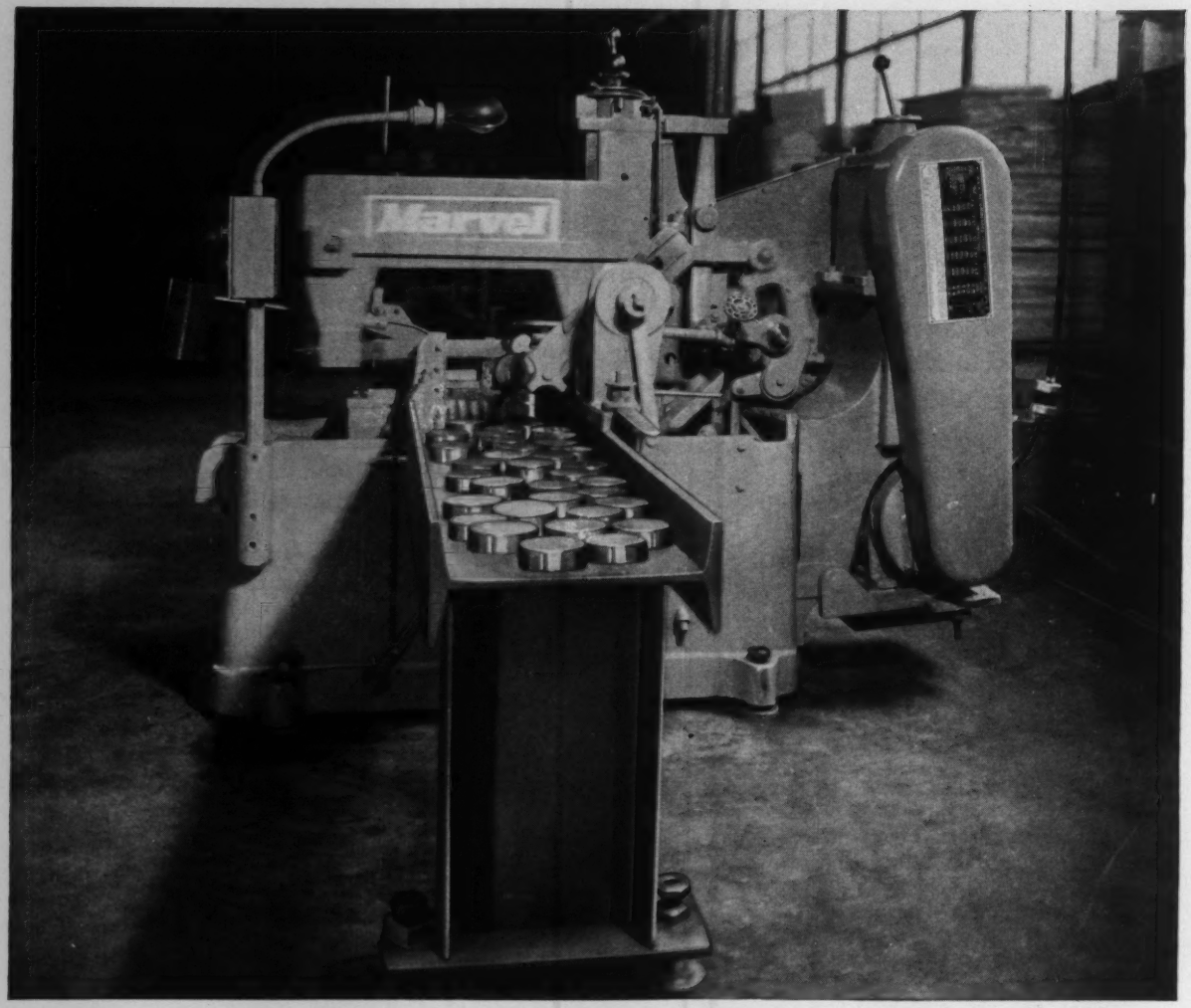
Shipbuilding Ventures — Also at Lockheed there'll be further moves into the shipbuilding field. The company already owns Puget Sound Bridge & Drydock Co., in Washington. The Italian firm, with which it's now allied, is also in shipbuilding and outfitting. In addition, it makes light trucks and motor scooters.

. . . **And Foreign Jets**—Douglas Aircraft says it's looking into a deal with Sud Aviation of France. It may make and sell the French firm's Caravelle jet transport in this country.

Convair, too, is negotiating with Sud Aviation.

Shape of Things to Come in Jet Airliners?

TRIPLE-SONIC TRANSPORT: Lockheed officials say this may be the type of 2000 mph jetliner in service within the next ten years. Plane would be designed for travel at Mach 3-3.5 speeds.



Payoff End of a Production Marvel

A cut-off saw's value is proven at the discharge end of the machine. How quickly the trough is filled with accurately cut-off pieces can mean the difference between profit and loss on many jobs.

The R. J. Sudrick Co., Des Plaines, Illinois, manufacturers of precision aircraft components had to cut-off 4600 blanks from 3¼" round, 303 Stainless Steel Bars.

They bought our MARVEL No. 6A4 High Speed Heavy Duty Automatic Bar Feed Hack Saw Machine; used MARVEL High-Speed-Edge Hack Saw Blades, and got the high production, accuracy and economy they desired.

PRODUCTION? Constant at 20 pieces per hour floor to floor

ACCURACY? Held well within the permissible tolerance of +.010 —.000

BLADE COST? Just 1½¢ per cut. Only twenty-three MARVEL blades were needed to make the 4600 cuts, and not a single blade failure due to blade breakage. MARVEL High-Speed-Edge Blades are unbreakable.

The point is this: MARVEL Metal Cutting Hack Saws equipped with MARVEL High-Speed-Edge Hack Saw Blades are an unbeatable combination for economical, accurate and safe cutting-off.

If your hack saws are not producing the economy you need to meet today's competition, try MARVEL High-Speed-Edge Blades. They will give you the competitive edge every time. Write for Catalog C-85 which has the complete story on MARVEL Hack Saws and Band Saws, Hack Saw Blades and Band Saw Blades.

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Small Companies Find R&D Pays

It Keeps a Company From Becoming Static

Many medium and small size firms still shy away from investing in research and development programs.

But more and more of them find the benefits outweigh the expense.—By R. H. Eshelman.

■ Medium and small firms often question whether they can successfully engage in research. Not that they are skeptical of research. But the feeling persists that only the industrial giants can afford this luxury.

However, many machine builders do have aggressive programs. More are finding a way to join their ranks. Michigan Tool Co. is one that has had a finger in this pie for some time. Harry Pelphrey, director of research and development, has definite ideas on the subject.

Role of Research — "Research activity spells the difference between a static company and one that is going some place. New products, based on research, provide for future business. As a machine tool builder we find research particularly rewarding in directing development of the right kinds of new equipment to solve process problems and reduce costs for our customers and in our own manufacturing divisions," he says.

Source of Suggestions—Suggestions or problems may come in from customers who wish to improve or change their products. Then, there's the firm's own management and the research division itself. Also, R & D is called upon to work out process problems for the company's own divisions.

What are the tools of research in this field? They may vary rather widely, depending upon the type of equipment the firm specializes in. Michigan Tool uses many of the regular laboratory tools.

Optical Accuracy—In the optical field they've set up an angular interferometer to check indexing tables and indexing plates. This type arrangement permits checking within an accuracy of ⅛ second—the equivalent of an arc of 0.0000006 in. at an inch radius.

Less expensive, but also effective, is the high speed camera. It slows down fast moving operations so you can get a good look at them and then analyze them scientifically.

Value of Records—Mr. Pelphrey considers record keeping "one of the most important phases of the work." The report form can be relatively simple.

Michigan Tool prefers one-page forms for metallurgical tests. Remarks state object of investigation, special information about heat treatment, and results of examination.

SPLIT-SECOND CHECK: Michigan Tool's Harry Pelphrey uses angular interferometer to check Ultradex indexing table. Table has a total index deviation of less than one-quarter second of arc.

INDUSTRIAL BRIEFS

Fall Date—Interstate Steel Co. is building a new $1.1 million warehouse and office at Des Plaines, Ill. Delayed by the steel strike, the new plant at 401 Touhy Ave. is now scheduled for completion this fall. The warehouse will be able to handle a capacity of up to 25,000 tons of steel.

Dutch Plant—Dow Chemical International, Ltd. S. A. is building a styrene-butadiene latex plant in Rotterdam, The Netherlands. The plant will be built and operated by Dow's Dutch subsidiary. Investment in the plant will total about $2 million. Completion of the new plant is scheduled for early spring of 1961.

New Appointments—P. A. Bennett, has been appointed acting director, Metalworking Equipment Div., Business and Defense Services, U. S. Dept. of Commerce. Mr. Bennett succeeds N. A. Olsen as director of the division. Mr. Olsen now becomes regional coordinator for Emergency Planning for the U. S. Commerce Dept. on the West Coast.

Same Way—Aluminum Co. of America has purchased Rea Magnet Wire Co., Inc., in exchange for common stock. Rea manufactures copper magnet wire for use in electrical and electronic equipment. Alcoa plans to continue the fundamental policies established by Rea management. No major changes in personnel or operating procedures are anticipated.

On the Coast—A California corporation has been formed as Bivans Conveyor Co. with headquarters at 2420 Eads St., Los Angeles. Bivans will design, fabricate and install standard and special industrial conveyors. This company is affiliated with Bivans Corp., Los Angeles, manufacturer of automatic cartoning and carton conveying machinery.

Deep South — First Mississippi Corp. of Jackson is negotiating to purchase assets of the Southern Div. of Associated Piping & Engineering Co. of Gulfport. The new concern will be known as Gulfport Piping Co. and will be a subsidiary of First Mississippi Corp. It will manufacture and fabricate piping components.

Purchase Order—The Tool Steel Gear & Pinion Co., Cincinnati, producers of hardened products purchased through a subsidiary, the Badall Engineering & Mfg. Co., Hammond, Ind. Badall produces high quality hardened iron, steel and tubular rolls.

Pipe Talk—Republic Steel Corp. is installing new equipment to expand production of plastic coated steel pipe at its Youngstown, O., plant. New facilities costing about $2 million will increase the company's X-Tru Coat pipe size range to include 6⅝" and 8⅝" outside diameter.

Under One Roof—The Westinghouse Air Brake Co.'s Le Roi Div. operations in West Allis, Wis.; Greenwich, O., and some functions of its Cleveland plant will be consolidated into one operating unit at Sidney, O. The unit will begin operations in the spring of 1960.

"Well, if I were you I certainly wouldn't fool around with it, Joe. . . . I'd see an optometrist!"

Old and New—Continental Copper & Steel Industries, Inc., New York, acquired the newly formed Technitron Corp. and certain issued and pending U. S. patents in electronics equipment and components. Development and production facilities are now being established at Union, N. J.

Mansfield, O. —A $2 million construction program doubling present production capacity of vitreous china plumbing fixtures is under way at Borg-Warner Corp.'s Ingersoll-Humphryes Div. Six new buildings will be erected at Mansfield, O.

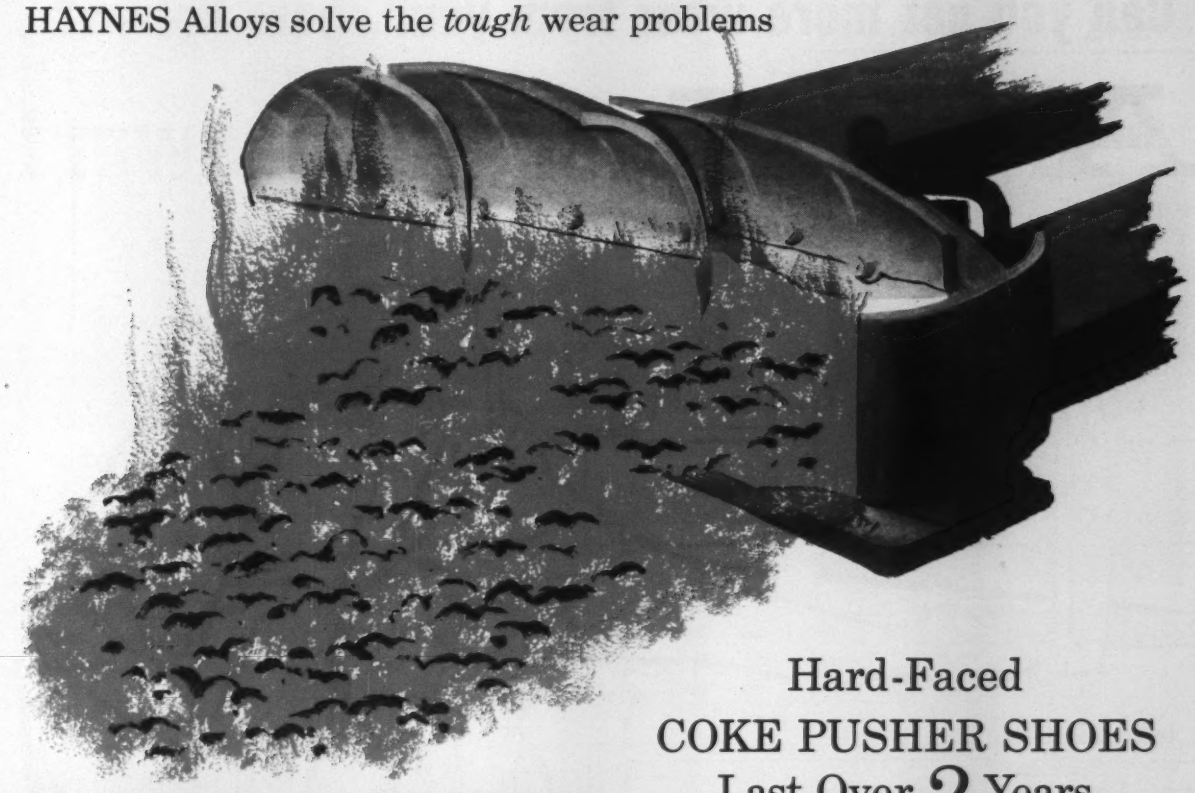
Investment Project — Hooker Chemical Corp. plans to invest about $10 million in a new installation of Hoechst-Uhde mercury-type electrolytic cells during 1960-61. This will increase production capacity of caustic soda, caustic potash and chlorine at its Niagara Falls, N. Y., plant.

Vive la France—Timken France, a division of The Timken Roller Bearing Co., will build a new shipping center at its plant at Colmar, France. It will be equipped with automatic handling equipment, and cost about $300,000.

How to Get Tungsten—A unit for producing a high-purity tungsten raw material, ammonium paratungstate, has been completed by Union Carbide Nuclear Co. The plant addition is an extension of the refining stage already in operation at Nuclear's Co.'s Bishop, Calif., facilities. It is a direct method for preparing ammonium paratungstate of this high purity from scheelite ore sources.

Boosting Aluminum Output—Aluminum Co. of America and Westinghouse Electric Corp. have developed a powerful 6000 kilowatt silicon rectifier unit. It is located at Alcoa's Badin, N. C., smelting works. Its use by the aluminum industry is reported to permit up to 4 pct greater output of aluminum per unit of energy consumed.

HAYNES Alloys solve the *tough* wear problems



Hard-Faced COKE PUSHER SHOES Last Over 2 Years

These shoes, hard-faced with HAYNES STELLITE alloy No. 1, resist abrasion from the coke particles and the lining of the oven floor. The hard-faced deposit does not chip or spall under the thermal shock of returning from 1800 deg. F., in the oven, to ordinary atmospheric temperatures.

Resisting severe abrasion, heat, and thermal shock produced by riding over the coke-covered floor of 1800-deg. F. ovens—these shoes hard-faced with HAYNES STELLITE alloy No. 1 lasted over two years. Ordinary steel shoes wore out in two months.

Whatever your wear or abrasion problem, there is a HAYNES hard-facing alloy especially made to combat it. There are 18 HAYNES hard-facing alloys . . . a wide selection that assures economical protection from the most severe conditions of heat, corrosion, erosion, or wear. For the complete story write for descriptive literature or contact our nearest sales office. HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, General Offices and Works, Kokomo, Indiana.

HAYNES ALLOYS

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Can you get more wear from your shear knives?

A·S·K for the answer!

Should your shear knives last longer? Could the cuts be more uniform and precise? Could the cost be lower? Get the answers from A.S.K.!

A.S.K. stands for American Shear Knife Company, the steel industry's leading authority on shear knife operation and production.

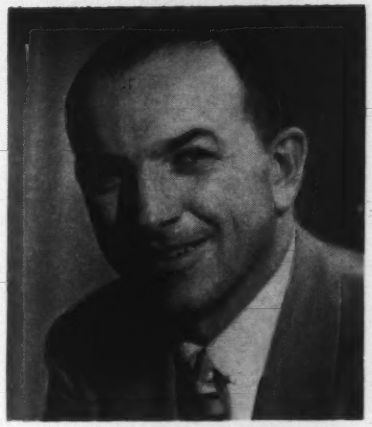
More than 90% of the nation's rolling mills call upon A.S.K. engineers (stationed in most key cities) to survey problems of knife life, cutting quality and operational costs. A.S.K. draws upon years of research in conjunction with top steel mill laboratories to select proper alloys and apply correct techniques in the heat treatment and precision machining of knives. It is this "custom" procedure that makes most A.S.K. knives last up to twice as long, give uniform precise cuts and reduce maintenance and replacement costs.

FREE SURVEY—Join the leading companies* who have asked A.S.K. to survey their metal-shearing operations. At no cost or obligation, A.S.K. will send an engineer to your plant to analyze your problems and make cost-cutting suggestions. Just write to American Shear Knife Company, Homestead, Pennsylvania.

A·S·K

AMERICAN SHEAR KNIFE

**names supplied on request*



B. F. Gira, elected president, United Industrial Corp., New York.

The M. A. Hanna Co., Lake Coal Div.—**W. A. Turner,** named president; **J. Q. Huey** and **G. P. Cooper,** appointed division vice presidents.

General Dynamics Corp., Stromberg-Carlson Div.—**G. G. Hoit,** appointed senior vice president.

General Electric Co.—**F. K. McCune,** appointed vice president, engineering services.

United Air Lines—**W. E. Alberts,** elected vice president and asst. to the president.

Pittsburgh Coke & Chemical Co.—**P. B. McDowell,** elected vice president, administration.

The Cleveland-Cliffs Iron Co.—**H. J. Leach,** elected vice president—foreign operations and iron ore development; **H. C. Swanson,** named manager, Michigan Mines, Ishpeming, Mich.

Fairbanks, Morse & Co.—**G. R. Anderson,** appointed executive vice president, operations.

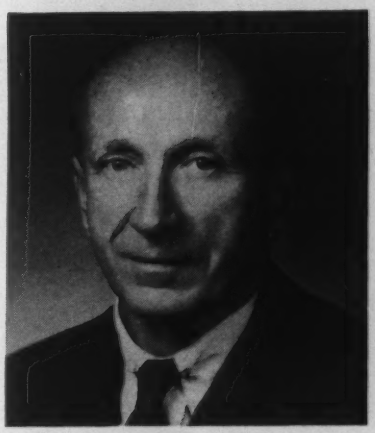
Union Carbide Metals Co.—**L. R. Stallings,** appointed special products manager, sales.

Magnus Chemical Co., Inc.—**E. H. Peterson,** named general manager of the company and its divisions; **B. H. Bailey,** appointed manager, Chemical Div.

The Capewell Mfg. Co.—**R. K. Hopkins, Jr.,** promoted to district manager, Cleveland; **Karol Stark,** named sales engineer, New York area.

The Torrington Mfg. Co., Air Impeller Div.—**C. A. Hathaway,** appointed asst. general manager.

Alan Wood Steel Co.—**T. E. Roberts,** appointed steel works metallurgist.



G. S. Mikhalapov, elected president, Brush Beryllium Co., Cleveland.

Norton Co.—**W. S. Elliott,** named supervisor, product utility section, Sales Engineering Dept.; **E. O. Anderson,** appointed asst. supervisor, Abrasive Timekeeping Dept.

The Babcock & Wilcox Co., Boiler Div.—**A. T. Fragomen,** named manager, Erection Dept.

Selas Corp. of America—**R. E. Greiss,** named production manager,

(Continued on P. 76)

H. J. Petersen, elected executive vice president, United Industrial Corp.

H. M. Winterson, named vice president, general services, Blaw-Knox Co., Pittsburgh.

J. L. Oberg, appointed a vice president, Metal & Thermit Corp., New York.

Hyde Park
Rolling Mill Equipment
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Complete range of stretching capacities from 150 to 750 tons, for levelling ferrous and non-ferrous sheets in sizes up to 120" wide x 500" long.

Speeds and length of "stretch" to meet all requirements.

Adaptable for automatic cycling.

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HYDE PARK
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Rolls
Rolling Mill Equipment
Gray Iron Castings

(Continued from P. 75)

all Manufacturing and Assembly Depts.

Firth Sterling Inc. — **W. J. Lohmeyer,** appointed manager, high speed steel sales.

J. K. Parks, appointed a vice president, Metal & Thermit Corp., New York.

Magnus Chemical Co., Inc., Equipment Div.—**A. W. Bowling,** appointed manager; **P. E. Gabelmann,** named technical director; **H. A. Rowan,** named chief engineer.

The Yale & Towne Mfg. Co.—**R. M. O'Donnell,** elected secretary.

Joy Mfg. Co., Western Precipitation Div.—**Pat Zilliacus,** appointed manager, agency sales, Los Angeles.

H. W. Buchanan, appointed a vice president, Metal & Thermit Corp.

G. W. Breiel, named manager, sales administration, Armco Div., Armco Steel Corp., Middletown, O.

Republic Steel Corp. — **J. E. Johnson,** appointed asst. chief engineer, Buffalo steel plant.

Allis-Chalmers Mfg. Co., Defense Products Div.—**A. F. Erwin,** appointed chief, advance design.

Pangborn Corp. — **J. D. Fitz-Gerald,** named abrasive sales engineer, Cleveland district.

S. A. Yager, becomes manager, western area sales, Armco Div., Armco Steel Corp., Middletown, O.

Harbison - Walker Refractories Co.—**C. D. Jamison,** appointed staff engineer, Research and Technical Sales Dept.

Sparton Corp., Sparton Electronics Div.—**R. H. Frye,** appointed

(Continued on P. 80)

40-ton Plymouth Diesel speeds pulpwood hauling for Heald Division of Mead Corporation, Lynchburg, Va.

"No down-time to date"—reports this Plymouth user

Tough, trouble-free Plymouths give years of dependable service. Take Mead Corporation's Heald Division, Lynchburg, Va., which recently replaced a 25-ton Plymouth Locomotive—in daily use for 20 years—with a 40-ton Plymouth Diesel. The new Cab-in-Front Model WDT with 6 wheel drive operates 16 hours a day, averages more than 6 round-trips daily between the storage yard and the mill. This double-duty work period requires constant hauling and switching plus intermittent shifting and spotting of cars. Grades range to 3% and even higher.

Company reports: "No down-time for repairs in over 9 months of continuous operation. Routine servicing requires only one-half hour per week."

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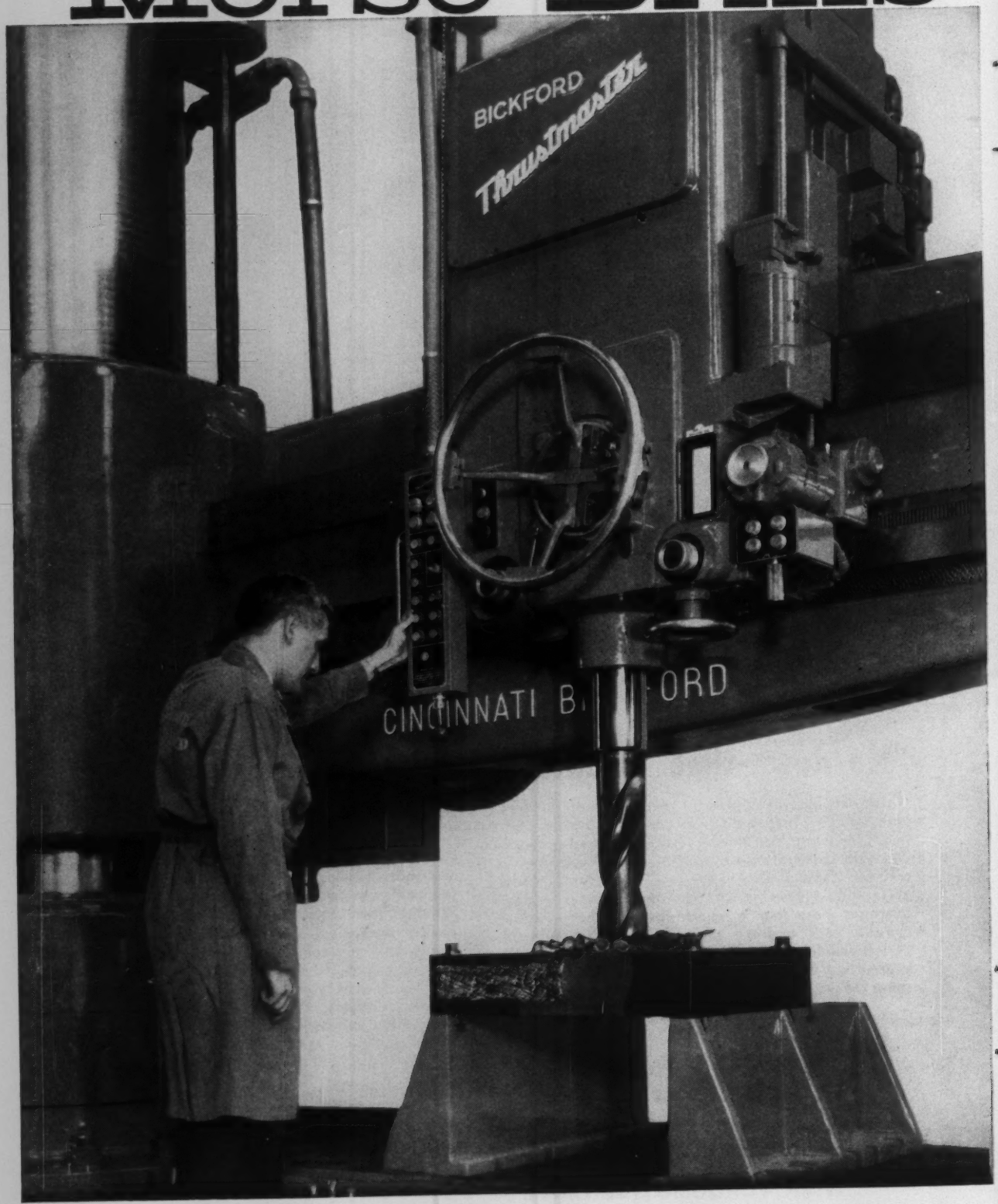
Morse Drills



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To demonstrate their new 50-horsepower, pushbutton-operated Thrustmaster...the most powerful radial drill ever built... Cincinnati Bickford tooled up with the toughest twist drill on the market—Morse.

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If you haven't already experienced the demonstrated superiority of the world's most complete line of quality cutting tools, call your Morse-Franchised Distributor today. He'll gladly show you the practical economies of buying the best... Morse Cutting Tools.

Look at these chips made during demonstration of the Thrustmaster.
Feed: .087" per revolution at 105 RPM
Drill: Regular Morse Taper Shank Drill (style 1302) driven in solid steel.

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MORSE means "THE MOST" in Cutting Tools

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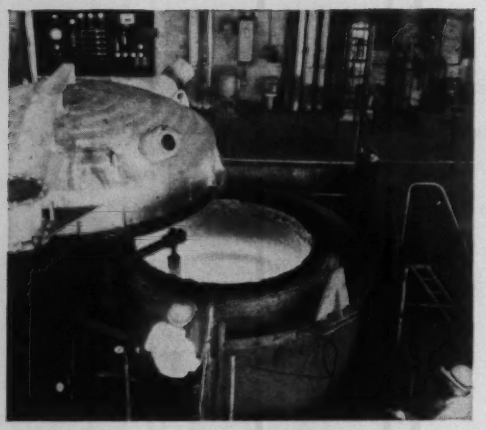
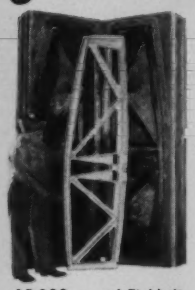
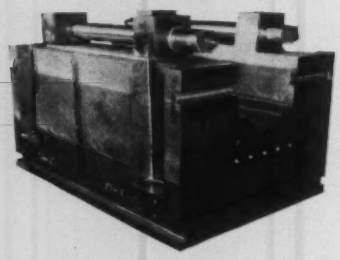


HOT WORK STEELS · DIE BLOCKS · FORGINGS · ELECTRIC FURNACE STEELS

FINKL *Vacuum Degassed* DIE BLOCKS and FORGINGS *give longer service life!*



Two 15,800 pound Finkl dies for precision aircraft forgings



36,000 pound die holder for use in titanium production, completely machined by Finkl

DIE BLOCKS made with Finkl vacuum degassed EF steels have greater ductility and toughness. This means that the chances of breakage under severe operating conditions is reduced. More production time is made available. With about 50% of the non-metallic inclusions removed from the steel, machineability is improved. Fewer tool regrinds are necessary. Higher lusters are obtainable in the impressions.

We supply 5 types of pre-hardened, ready-to-use die blocks, inserts and hot work tools in Special Machining Quality steel.

FORGINGS by Finkl are famous for their strength and resistance to withstand the severe stresses and strains imposed by modern heavy-duty machinery. Now available on request are Finkl vacuum degassed EF alloy steel forgings. The degassed steel adds even greater toughness and ductility to the forging, and the cleaner steel substantially increases tool life.

We also furnish forged parts of carbon steels in smooth forged, rough- or finished–machined condition.

FORGE REPAIR PARTS with the advantages of Finkl vacuum degassed EF alloy steels are also available on request.

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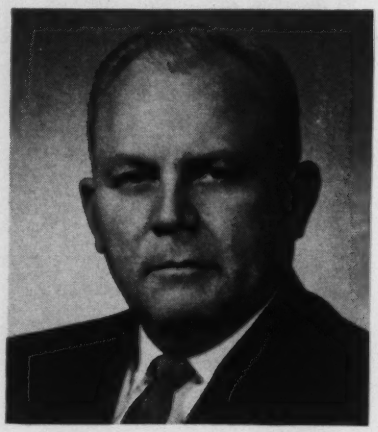
(Continued from P. 76)

general manager and **J. A. Stewart,** operating manager.



P. F. Pardonner, named manager, central area sales, Armco Div., Armco Steel Corp., Middletown, O.

B. O. Young, appointed product manager, alloy and carbon specialties, Crucible Steel Co. of America.

The Weldon Tool Co.—**S. E. Smith, Jr.,** named general sales manager.

H. K. Porter Co., Inc., Leschen Wire Rope Div.—**A. J. Abruzzo,** appointed Prestress engineer.

The Carborundum Co., Curtis Machine Div.—**R. D. Rutt,** promoted to production manager; **P. W. Joy,** named manager, technical branch; **A. C. Carlson,** promoted to manager, Machine Design Dept.; **W. C. Keyes,** becomes senior design engineer, and **F. M. Owrey,** named senior quality control engineer.

Thousands of ways to cut bearing costs lie in our huge stock of high-precision dies for sintered bronze or iron bearings. The world's largest inventory of dies is ready at an instant's notice to turn out the exact bearings you need . . . without the delay or expense of tooling. One more assurance of the exceptional service you can expect of Bound Brook.

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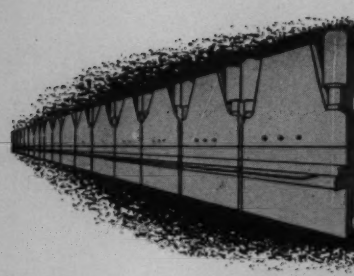


4,769 years to arrive ACCURATE HYDRAULIC

122 out of 124 hydraulic press brakes in U.S. aircraft industry are PACIFIC

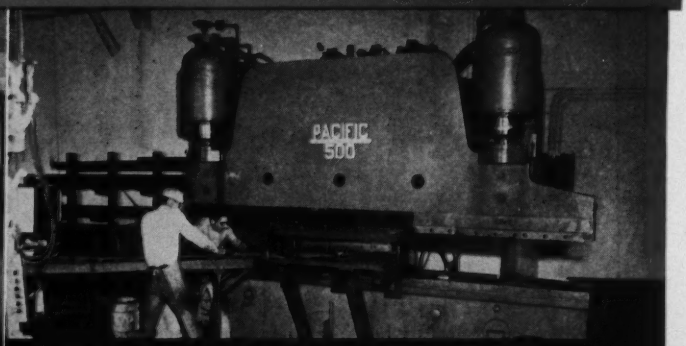
Aircraft manufacturers work to the closest tolerances of all industries in metal forming. Douglas Aircraft Company, Tulsa, Oklahoma, with 8 Pacific Brakes (above) is typical of the airframe manufacturers who have selected Pacific for its precise accuracy.

924 PACIFIC Brakes, representing over 95% of all hydraulic press brakes in use today, have operated for an aggregate of 4,769 years to test and confirm PACIFIC designs that have established hydraulic press brakes as far more profitable to operate than mechanical brakes. However, only PACIFIC has precise accuracy, versatility, high speed and dependability that comes from years of experience in manufacturing, developing and improving this unique machine. It is the only hydraulic press brake in daily operation that is actually air bending, straightening, deep drawing, blanking, and doing heavy punching. Accuracy within thousandths of an inch (greater than with any mechanical or other hydraulic brake) repeats itself on every stroke. Ram remains level regardless of location of work on the bed. PACIFIC sizes range from 60 tons to 1500 tons.

PACIFIC HYDRAULIC

Only hydraulic brake built for HEAVY PUNCHING

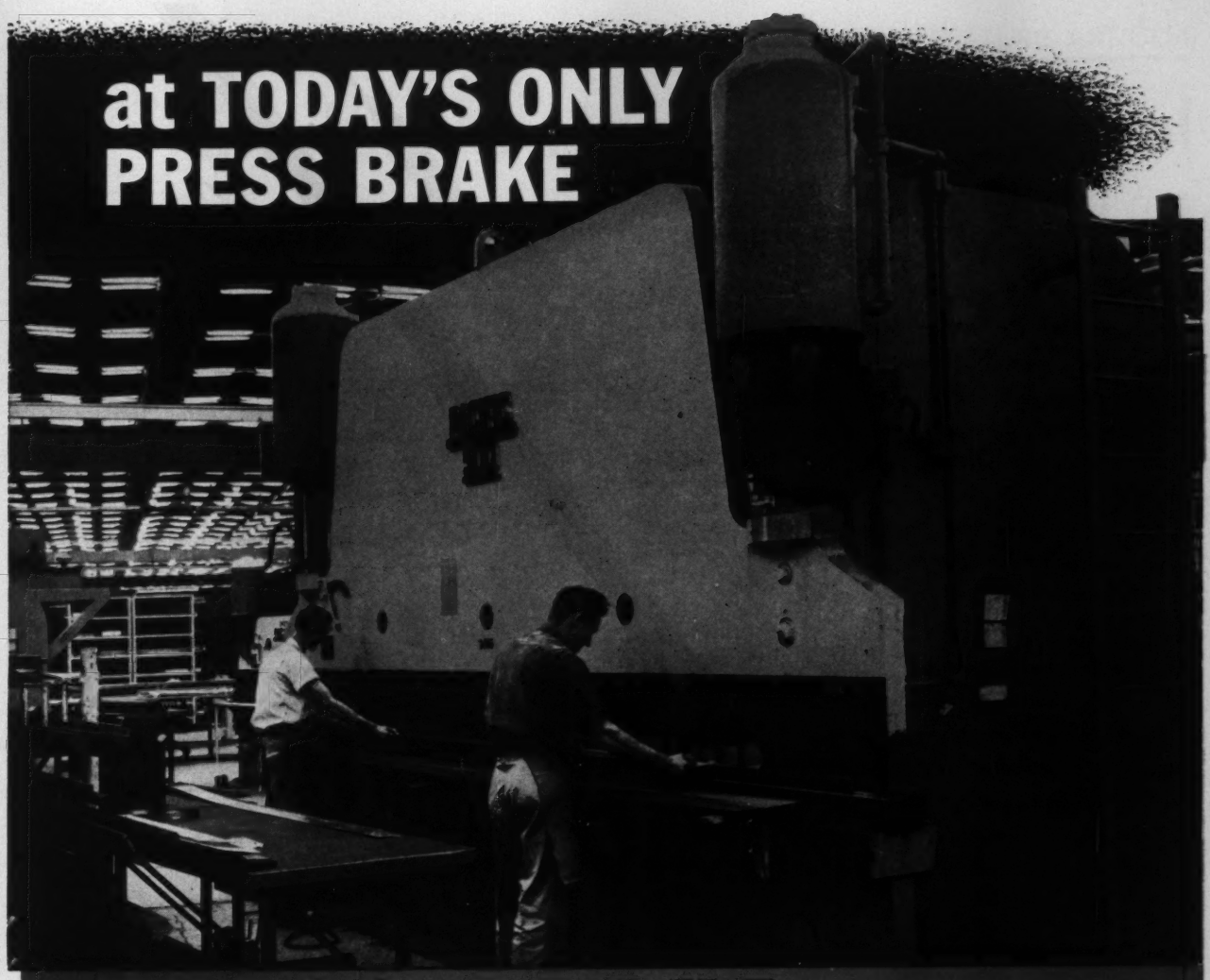
Pacific is uniquely designed to absorb heavy shock from punching in the hydraulic system rather than in the frame of the brake. Cushioned against shock, punch and dies stand up from 3 to 8 times longer than with mechanical brakes. Photo (above) shows 1" alloy steel plate being punched at earthmoving equipment plant.



MAINTENANCE-FREE for years

Dependable, simplified electrical and hydraulic controls can easily be kept working continuously by any plant maintenance crew. There are no complicated electronic devices. In photo (above) at agricultural equipment plant, the 500 ton Pacific Hydraulic Brake shearing ¾" alloy steel plate with Pacific Shearing Attachment has operated continuously for the first 4 years at a cost of $5.22 in replacement parts.

at TODAY'S ONLY PRESS BRAKE



PRESS BRAKE

HIGH SPEED operation

Pacific adjustable stroke length can be shortened for rapid stroking. Automatic, self-leveling ram permits use of progressive dies across entire bed of press. The automatically-fed Pacific at automotive parts plant, which can cycle up to seventy 1½" strokes per minute, is forming 3780 operations per hour in the above photo. In virtually any operation, Pacific's high cycling speed equals or exceeds materials handling capacity.

Write for brochure

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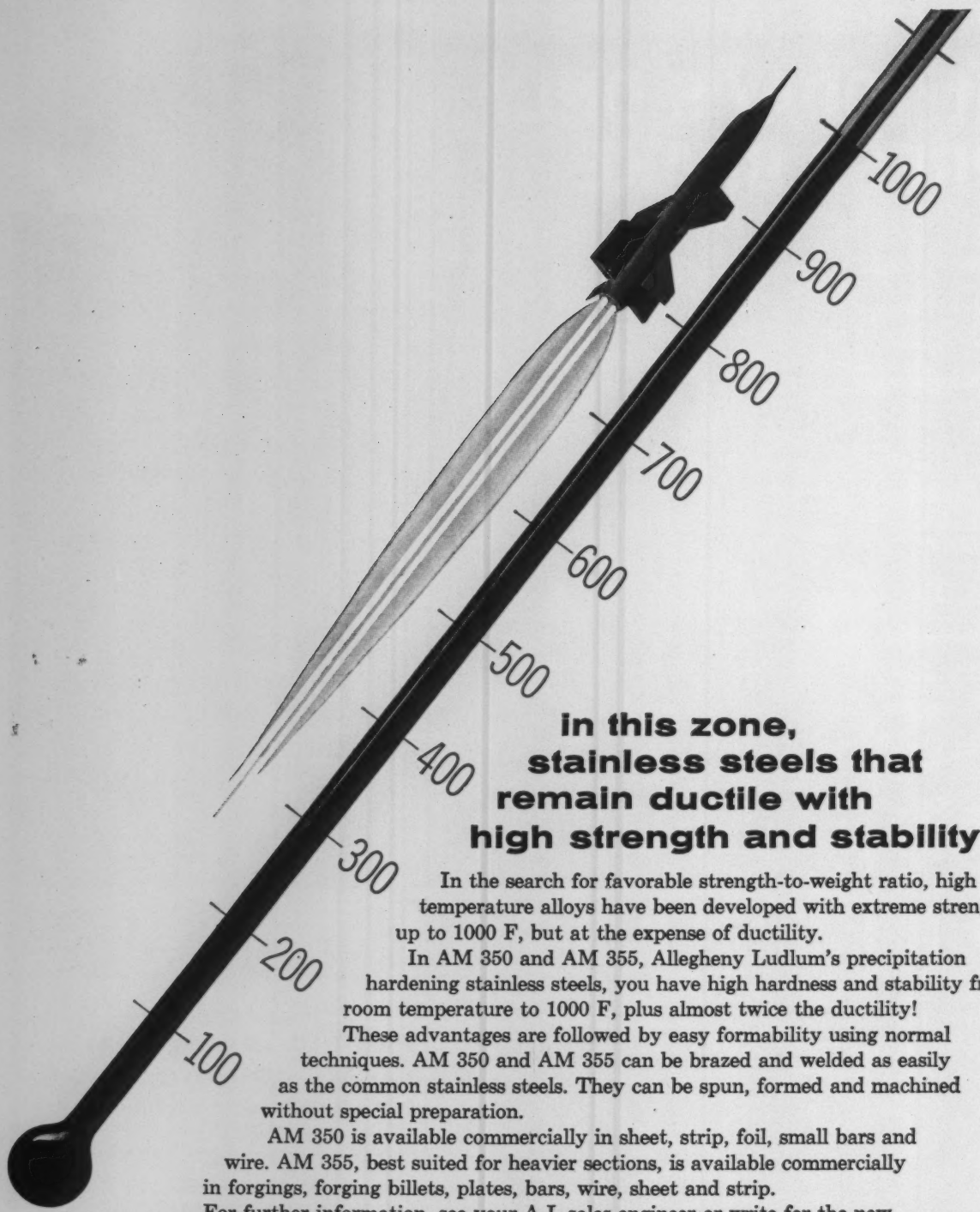


in this zone, stainless steels that remain ductile with high strength and stability

In the search for favorable strength-to-weight ratio, high temperature alloys have been developed with extreme strength up to 1000 F, but at the expense of ductility.

In AM 350 and AM 355, Allegheny Ludlum's precipitation hardening stainless steels, you have high hardness and stability from room temperature to 1000 F, plus almost twice the ductility!

These advantages are followed by easy formability using normal techniques. AM 350 and AM 355 can be brazed and welded as easily as the common stainless steels. They can be spun, formed and machined without special preparation.

AM 350 is available commercially in sheet, strip, foil, small bars and wire. AM 355, best suited for heavier sections, is available commercially in forgings, forging billets, plates, bars, wire, sheet and strip.

For further information, see your A-L sales engineer or write for the new technical booklet, "AM 350 and AM 355." **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Penna.**

861

ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

Explosive Hardening of Steel Proves Out in Field Service

By W. A. Harper—Chief Engineer, Taylor-Wharton Co., Easton, Pa.

Before Velocity Impact Hardening (VIH), manganese steel had to be hardened by pressing or hammering.

Now, explosives do the job in a fraction of a second.

Other advantages: Treats irregular surfaces; spots flaws in castings; less deformation in the workpiece.

▪ Velocity Impact Hardened (VIH) Hadfield's manganese steel will soon celebrate its third birthday in field service. In 1957, the first lot of VIH special railroad trackwork was installed. The findings show that the trackwork's higher yield strength, imparted by the process, defers field maintenance.

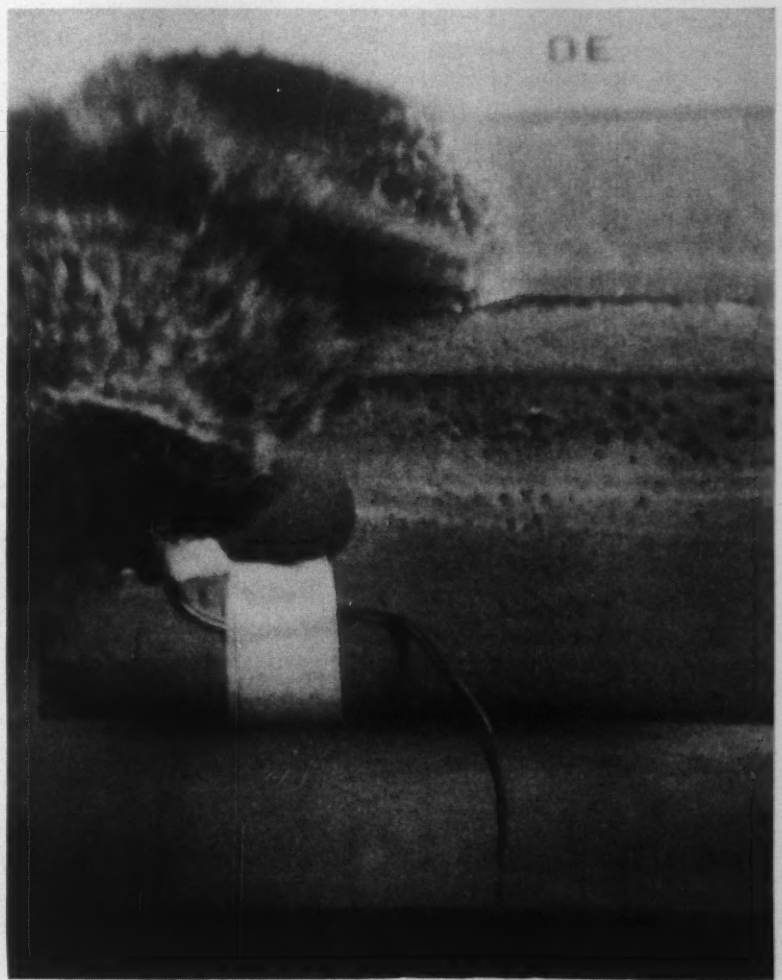
Now, another lot is being processed to supplement the first installation. And many other re-orders are convincing proof that VIH has won an important place in manganese-steel metallurgy.

Hardens in Service — Hadfield's manganese steel responds by work hardening when permanently deformed. Deformation may be done in field service; or it may be done mechanically by hammering, pressing, stretching, bending, or peening —alone or in combination.

Hardness increases with multiple working of the metal such as under repeated impacts. In actual practice, the desired depth is obtained during the first "pass" of hammer or press. Subsequent "passes" increase the hardness at lesser depths.

Mechanical cold-work-hardening is a metal flowing process; and the work piece changes shape. This dimensional change must be anticipated by a change in the pattern with the hope that work hardening restores the desired dimensions.

Treatment is Severe—It is therefore obvious that mechanical working must be confined to accessible



Courtesy of E. I. Du Pont de Nemours & Co., Inc.

HARDENS WITH BLAST: After detonation of sheet explosive, compressive "pressure wave" of about 1,000,000 psi hardens switch point.

surfaces; and the workpiece has to be strong enough to withstand this severe treatment.

The term VIH (Velocity Impact Hardening), suggests the character of the new process. Shock waves of high magnitude pass through the workpiece at great speed.

The special high speed photograph shows a railroad switch point on which a sheet of special explosive is being detonated by an electric blasting cap.

Shows Detonation Line—A cloud of gas envelopes the portion of explosive that has spent its charge. Visible at the leading edge of the gas cloud is the nearly vertical line of detonation. It can be seen at the upper center of the picture.

Detonation speeds across the sheet explosive at a rate of 7000 meters per second or greater than 15,000 mph. Orientation of travel direction is part of the design of the process.

Under the line of detonation is a compressive force of upwards of 1,000,000 psi. This "pressure wave" travels down into the workpiece and across it at the speed indicated.

Reverses Direction—This type of pressure wave has a very thin interface. For example, at one millisecond, a volume of metal immediately under the line of detonation is subjected to pressure; and in the next fraction of a second, the pressure reverses.

After this primary wave is a family of waves—usually of decreasing magnitude. The force of these pressure waves creates the slip or strain line which characterizes work hardened manganese steel.

The micrograph is of a work-hardened austenitic manganese steel specimen. The intra-grain slip or strain lines identify the work hardened metal.

Must Control Forces—The shock waves, produced by the sheet explosive, do not confine themselves to the workpiece. They can cause unexpected damage at a considerable distance from the areas being hardened. Caution must be taken to direct, or otherwise control, these forces.

As pointed out earlier, the workpiece is exposed to the forces of highly compressed gases immediately following detonation. Gas loads are a nuisance as they may bend, warp, break, or otherwise harm the workpiece. Their effects are more severe when the process is done under water than when surrounded by unconfined atmosphere.

Bulk Explosives Fail—Much experimental work has been done with explosives by manually forming sheets from bulk materials. The process faltered for two reasons: need for high technical skill and inability to reproduce results.

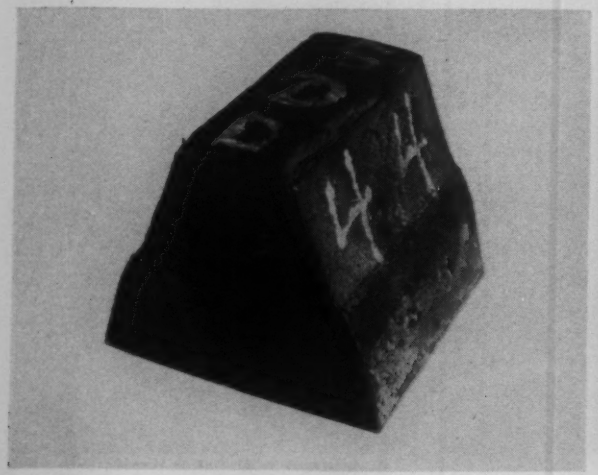
However, with the availability of EL-506 sheet explosive from Dupont, less skill is required and results are reproducible.

This product is presently available in two weights, or thicknesses. It is pliable. It can be cut to any size and bonded onto surfaces of various shapes. An electric blasting cap detonates it. As explosives go, this material is not easily set off, and it is relatively safe to handle.

Test for Hardness—VIH is often performed on unmachined surfaces which are then ground (to make smooth and to remove decarburized metal) before taking hardness readings.

Hardness patterns in the graph are Rc readings taken on transverse sections. It shows that a number of different hardness patterns may be had on a given workpiece by varying the number and intensity of impacts. (Unhardened manganese steel

Welding May Decrease Gains of VIH . . .



WELD HOLDS UP: Re-hardening on top of weld does not damage the weld or the base material.

HARDENS WITH VIH: Isohardness lines show hardness pattern as originally hardened with explosives.

is assumed to have a hardness of 19 Rc.)

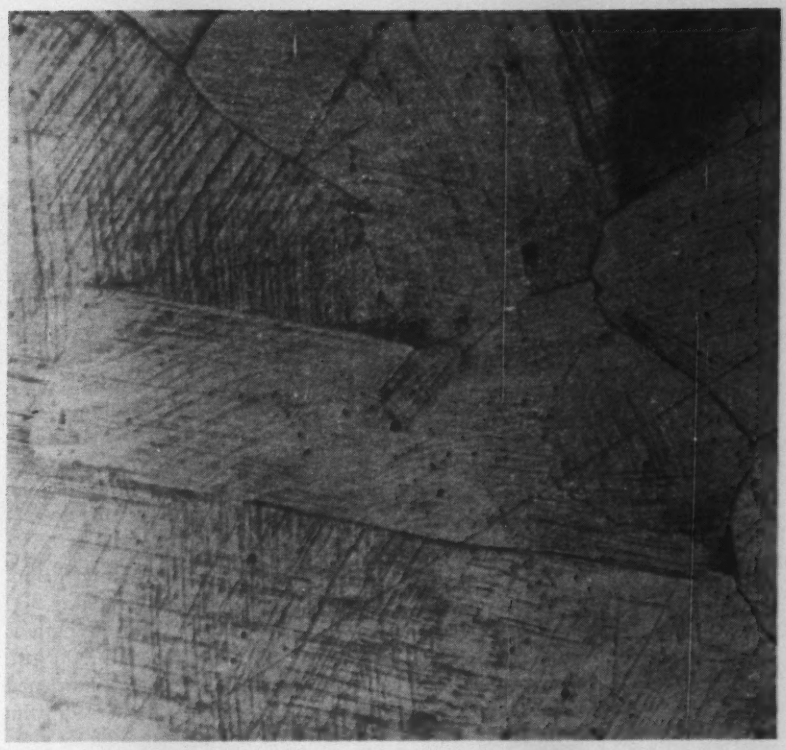
Proper procedure calls for designing VIH from the working drawing before the casting is poured. It is often necessary to make alterations to compensate for slight metal deformation and for overall distortion.

This is especially true when the VIH surface is finished to close tolerance, such as special railroad trackwork. And in the case of jaw plates for stone crushers, the part is machined on the reverse side after VIH.

Improves Castings—Introduction of the new explosive hardening process results in upgrading of commercial castings from the foundry. VIH is a rigorous inspector. It reveals inclusions, shrinks, cracks, and certain other defects which are not discovered by routine inspection, and which may not be detrimental to the workpiece in normal service.

Thus, the foundry must re-evaluate its methods and controls to produce casting soundness to the degree demanded by VIH; and when a customer buys a casting that has been hardened by VIH, he is assured of sound metal throughout.

In some cases, patterns have been restudied to produce sounder metal in critical sections through the redesign of risers, gates, and wall sections. This procedure has a carry-over into foundry methods with benefit to all customers.



REVEALS STRAIN LINES: Explosive hardening forms slip lines in manganese steel similar to those formed by other work-hardening methods.

How About Welds?—It is well known that certain large castings

. . . But Another Treatment Renews Hardness

HEAT AFFECTS PROPERTIES: Hardness values nearest the two-pass weld show the greatest decrease.

RESTORES HARDNESS: Detonated explosive, covering the same area as at first, re-hardens workpiece.

are often repaired by welding at the foundry. Sound welds stand up well to VIH; and, when done properly, the required piece responds to VIH in the same manner as the parent cast material.

Welding after VIH is another story; for heat from welding removes the internal stresses which characterize hardened manganese steel.

The photograph at the bottom of a previous page shows a section of a workpiece that had been hardened, welded, and re-hardened.

No Damage—Close study reveals no separation from parent metal; also, no harmful effects to either the weld or parent material are visible. (The small indentations are the result of hardness traversals.)

The linecuts show lines of equal hardness of test pieces in either the hardened, welded, or re-hardened condition.

Note that the hardness decreases in the vicinity of the weld; but re-hardening gives an improvement over the original hardness values.

Need Rapid Cooling—The weld must be sound and free from inclusions. Good practice calls for the weld material to be the same as the parent metal. Welding should be done under conditions that permit rapid cooling of the heated zone between passes to insure austenitic metal in both weld and parent metal.

Stress - strain relationships are hard to obtain. One problem is to produce a test bar with absolute uniformity of hardness.

However, tests indicate a trend worthy of mentioning. The yield strength of VIH manganese steel is between 300 and 340 times Bhn. For example, when hardness is 300 Bhn, the expected yield strength is between 90,000 and 102,000 psi. But the hardness of unhardened manganese steel is about 190 Bhn and it has a yield strength of 45,000 psi.

Thus, an increase in hardness of 50 pct results in an increase in yield strength of more than 100 pct. These figures indicate that a modest hardness level is enough for greatly improving strength and service of the workpiece.

Boosts Properties — VIH enhances value of product by increasing hardness and strength.

Four examples can be cited. For one: sections of chain elements, such as in tread links of power shovels, are subject to stresses in operation which cause metal flow; that is, they change the pitch. This leads to interference between chain elements, and faulty sprocket action.

A second example deals with austenitic manganese steel castings for special railroad trackwork. These components have been pre-work hardened by pressing and hammering for years. VIH offers more uniformity, and hardness at greater depths. It also permits hardening flangeways inaccessible to hammers.

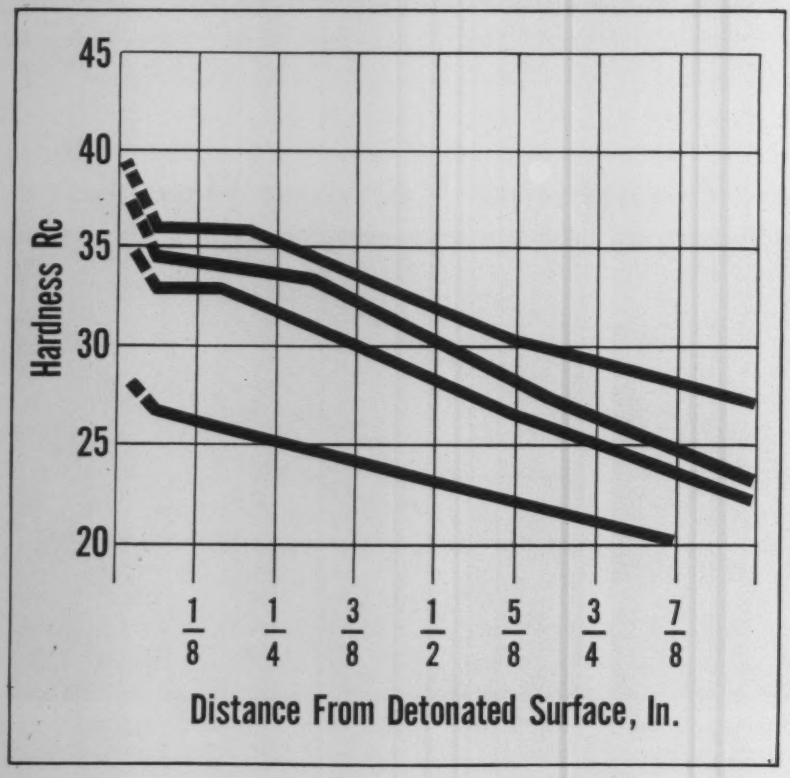
Greater Resistance — Operators now know that a jaw plate that widens in service must be removed from the crusher and ground to its original width. The third case points out that crusher jaws that have been subjected to VIH offer greater resistance to dimensional change.

Under some abrasive conditions, VIH manganese steel provides greater life. A fourth example is a cutter working against a face of coal.

This process for pre-work hardening of austenitic manganese steel enlarges the horizon for the design engineer. He literally has a new material with which to work.

The result is that VIH extends the usefulness of manganese steel by strengthening the workpiece in selected sections in addition to imparting higher hardness.

VIH Varies Hardness Patterns



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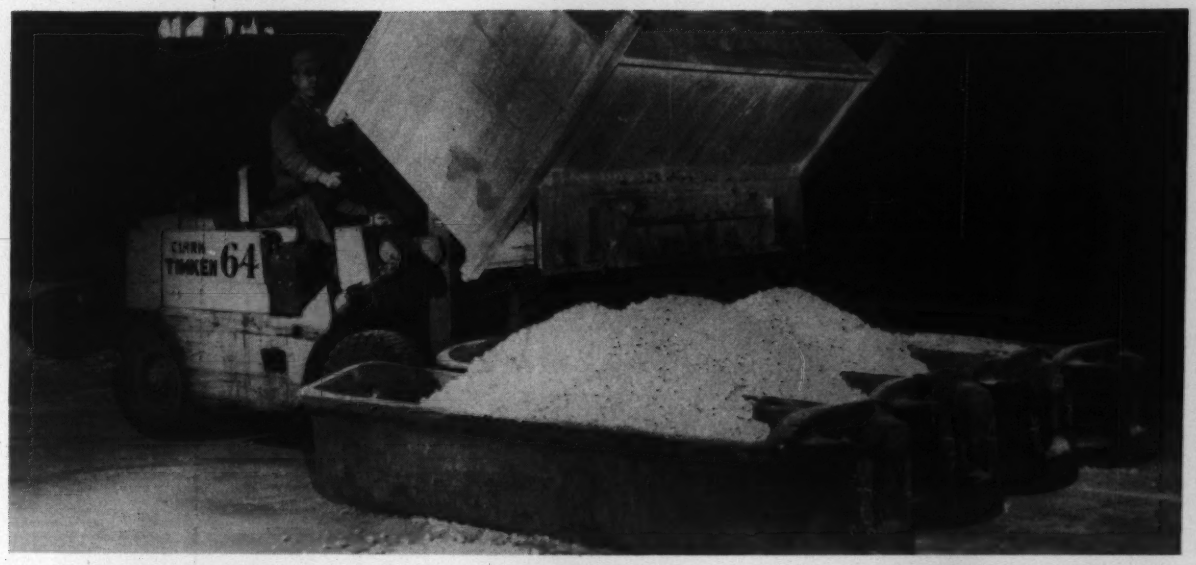


FULL MEASURE: A lift-truck operator suspends a full container of lime over three charging boxes. He trips a release to spill the contents. Each container holds exactly enough lime to fill three charging boxes.

Keep Lime Flux Moisture Free

Dump lime on the charging floor and it absorbs moisture.

A new handling system keeps down lime's unwelcome hydrogen content. It saves space, reduces handling, cuts dust and improves inventory control.

▪ Waterproof metal containers are cutting lime handling problems in a melt shop. These units eliminate water absorption by the lime.

This minimizes moisture and hydrogen content. Hydrogen produces undesirable factors in quality steelmaking.

Each metal container, used to haul and store lime by the Steel and Tube Div. of Timken Roller Bearing Co., Canton, O., holds enough lime to fill three charging boxes. Fresh lime, trucked in daily, cuts slag control problems.

Less Dust—Use of the new handling system gives positive control of all lime entering the plant. It also improves inventory control and reduces handling costs. Elimination of shoveling operations cuts down lime dust.

The containers, 38 in. high, 40 in. wide and 80 in. long, fit into flat truck beds. Two trucks, purchased for the purpose, haul them to the plant. Each truck holds 10 containers. Filling takes place on the trucks.

Two lift trucks unload a shipment of containers in a few minutes. The storage area, about 100 yd away, is directly beneath the melt shop's charging floor.

Good Design—Flanged pedestals at the top permit containers to be stacked one on top of another. Pins at the top speed dumping. A trap door at the bottom releases the lime.

Lime for the charge floor gets first priority. But, it's taken from the storage area rather than directly from the hauling trucks. This maintains consumption on a first in, first out, basis. It also assures the melt shop a fresh, uniform quality of lime.

Lift trucks transport the lime to the melters. They maintain an 8-hour supply in the charging boxes. Excess lime, in the metal containers, absorbs little moisture nor does it slake.

Operating at full capacity, the company's nine electric furnaces require about 100,000 lb of lime daily. Formerly, to fill this need, lime arrived in carload lots. Dumped directly into charging boxes, or piled into shallow containers on the charging floor, the lime absorbed plenty of moisture. It also took up vital space.

Saves Space—Using an adapter, a lift truck operator suspends one of the new containers over three charging boxes. A release to the trap door trips and spills the contents. Only the lime needed for one shift comes to the melt shop.

Empty containers go back to the storage area. Inventory control is simple. Empty containers, loaded on the trucks, return to the supply source. Demand regulates lime levels to suit melting operations.

New Spray and Heat Process Spots Flaws in Honeycomb

A major drawback in the use of honeycomb panel is the lack of a complete test to check the brazed joints.

A new process requires only spraying and heating to show up any flaws.

▪ Honeycomb is a familiar word these days. Structures made of honeycomb are popular with the aircraft and missile industries; they offer high strength, light weight, and good corrosion resistance.

Industries with other than space interests are also working with honeycomb. These include makers of machine housings, liquid-storage tanks, and marine components.

Inspection Problem—But, there's a fly in the ointment. Completed sandwich panels present an inspection problem. In fact, "the difficulty encountered in testing completed honeycomb panel, other than by destruction means has long been recognized as a drawback in the use of sandwich material," according to the Stanford Research Institute, Menlo Park, Calif.

A big step toward solving this problem appears to be a thermographic test system, called Bondcheck. According to its developers, Magnaflux Corp., Los Angeles, the new test system detects lack of braze, excessive braze, deformed core and other irregularities in honeycomb panels.

Quick and Cheap—It is also claimed that Bondcheck does the job with a higher degree of accuracy and in less time and with less money than the methods now in use.

Here's how it works—a sandwich panel to be inspected is sprayed with a special heat-sensitive fluid. This fluid can sense temperature differentials; a warm area repels it; a cold area makes the fluid coalesce.

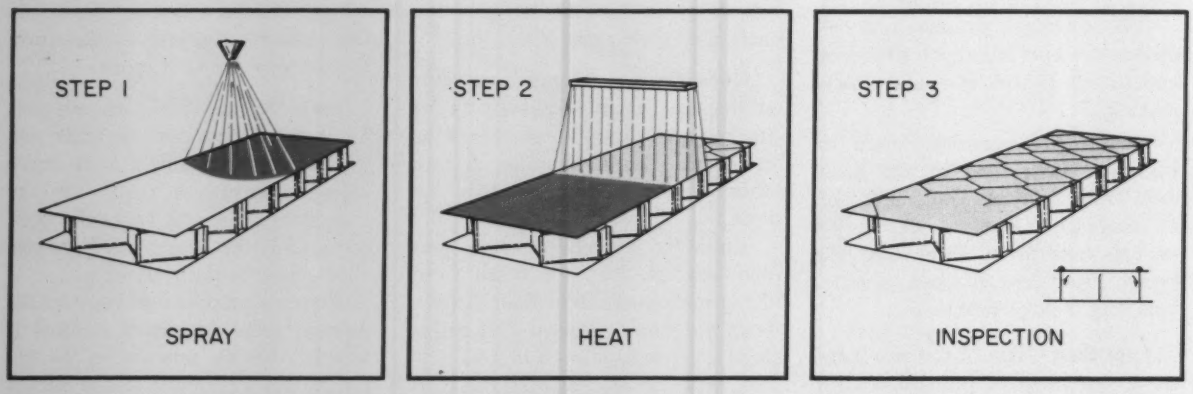
The next step calls for the sprayed area to be heated with infrared lamps to about 300°F. The core partitions, where brazing has taken place, act as heat sinks and are cooler.

Shows Good Braze—Thus, the liquid flows to each area of good braze and coalesces. Where there is no braze, no pattern appears; where core is deformed, the pattern duplicates the irregularities whether they are voids, lack of braze, wet braze, uneven braze or deformed core.

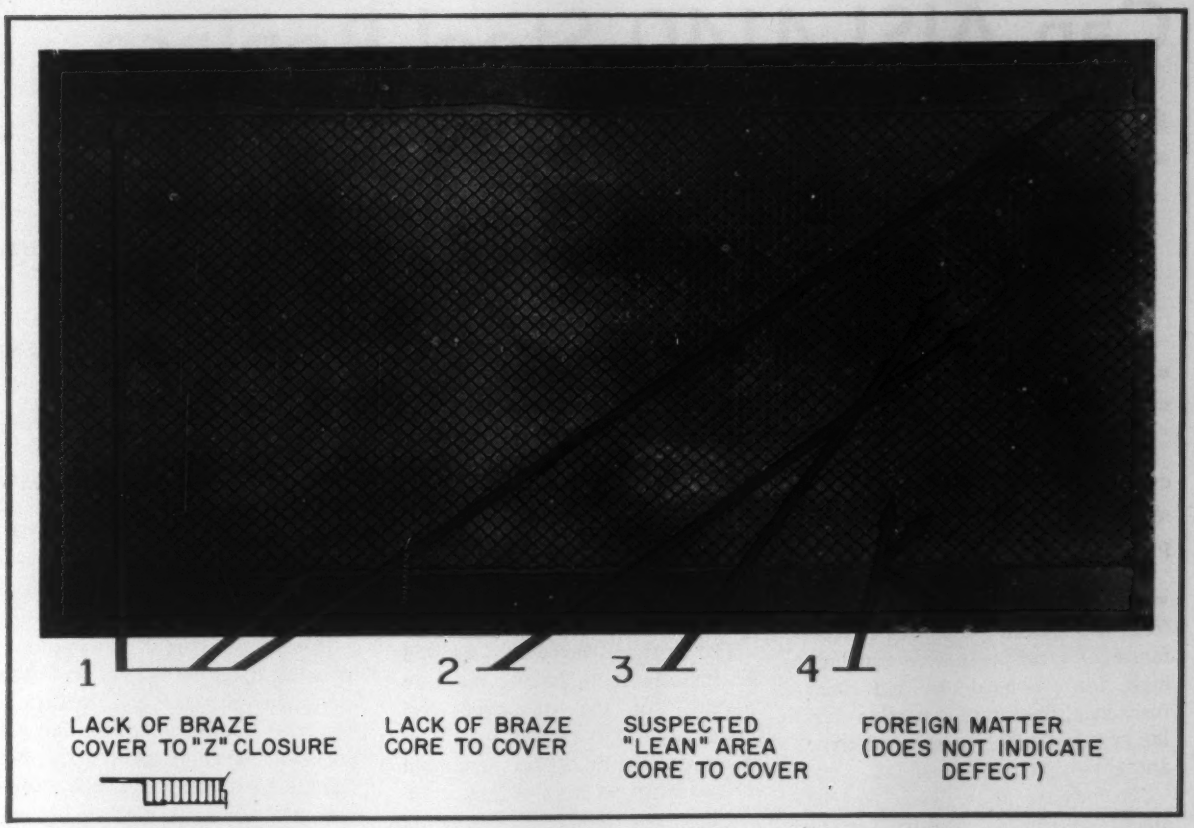
After heat development, the coating sets, dries, and acts as a protective coating for the honeycomb skin. The coating can be removed with a solvent. But first, a permanent record can be made by photography, if desired.

Using this system, both flat and curved shapes with skin thicknesses ranging from 0.002-0.045 in. can be inspected at production speeds. For structures with skin thicknesses greater than 0.045 in., it is difficult to obtain distinct patterns. Also for best results, the panels should be at a pre-test temperature of 60°-80°F.

Controls Spray — In operation, the fully automatic equipment in the test system provides for accurate control of the speed at which the honeycomb is processed. It also regulates the spraying pressure and movement for uniform coverage, and the intensity of the heat from the infrared source.



INSPECTION IS EASY: Thermographic process takes three simple steps. Spray on special fluid, then dry. Braze pattern is now visible. There's no need for special training to operate the equipment.



DEFECTS SHOW UP: Thermographic process points up defects sharply in this 12 x 24-in. panel section of a missile frame. Material is stainless steel brazed with nickel-boron. It takes only one minute per side.

The honeycomb section travels under the spray apparatus by means of a variable speed table. Right after application of the fluid, infrared lamps heat the skin and develop the surface coating. As soon as the test piece passes under heat, the fluid dries and is ready for inspection, storage or shipment.

There is no known limit to the size or shape of panels for which test equipment can be designed. But the surface of the panels must be accessible for processing, inspection, and photographing.

Needs Trial Runs — Setting up for a particular production run may require two or three test runs with a sample panel to adjust the built-in variables of speed, spray pressure and heat intensity.

Set-up time for a 2 x 4 ft panel takes about 5 minutes. Once the optimum settings are put into the controls, any number of pieces may be run. Processing can then be done at a rate of 30 sq ft per minute. Panel width has no effect on this speed.

There is one particular limitation to Bondcheck. As noted before, the thermographic process depends upon the ability of the core material to dissipate heat from the skin; this gives rise to the thermal differential on the skin's surface. Thus, if the sandwich is bonded with a non-metallic agent, the process will not work.

Low Investment — How about cost? Capital investment in Bondcheck test equipment, which includes conveyor, processor, and optional photographic units, is a third of that of the other systems now available.

Highly trained technicians are not required to operate the equipment because the process requires only three simple steps, automatic spray, automatic heat, and inspect.

Therefore, it is estimated that labor costs and materials costs are reduced by more than 80 pct. The total cost of material and recording film for Bondcheck is no more than 17½¢ per sq ft.

According to company spokesmen, Bondcheck's potential is not limited to the design and production areas. They expect to adapt it for line maintenance and overhaul inspection of honeycomb parts in supersonic aircraft both in military and commercial service.

Another important point: The reduced cost of the Bondcheck test will allow greater use of the all-metal sandwich material in component manufacture. Previously, expense may have precluded its adoption even where design requirements indicated its use.

Can AISI 4140 Steel Replace Special Nitriding Grades?

By W. Simon—Materials Engineering Depts., Westinghouse Electric Corp., East Pittsburgh

Special nitriding steels are not always available in all sizes; and they are expensive.

Recent data show that a one-cycle nitriding process often allows the use of AISI 4140 in place of the special steels.

▪ The popularity of nitriding stems from the special properties it confers upon steel parts. These include high surface hardness and wear resistance, minimum distortion during heat treatment, increased fatigue and corrosion resistance.

To achieve these ends, special steels, known as nitriding steels, were specially designed for nitriding. They contain optimum amounts of chromium, aluminum, and molybdenum.

These nitriding steels however, are not always available in all sizes; and they are expensive. One way out may be the use of the well-known, low-cost, low-alloy steels such as the AISI 4100 and 4300 series. But how well will the standard two-cycle nitriding process work with the low-alloy steels?

Describes Conditions—A recent article in The IRON AGE (May 29, 1958 pp 90-93) described optimum conditions of low-alloy steels before nitriding. It also described a special one-cycle process for successfully nitriding low-alloy steel.

The article, however, stressed the importance of having the core hardness of the quenched and tempered (QT) low-alloy steel above 36 Rc to obtain maximum surface hardness by nitriding.

Since the larger diameters of AISI 4140 cannot conveniently be hardened to this level, and since our nitriding applications sometimes require large diameters (4 in. or greater), it became necessary to obtain more detailed information on this aspect of the problem.

A study was recently completed. One conclusion: with a one-step nitriding cycle, AISI 4140 can be often used in place of the special nitriding steels.

Nitride with Ammonia—Nitriding is done by exposing finish-machined steel parts to a nitrogen-hydrogen-ammonia atmosphere at temperatures from 925°-1100°F. The atmosphere is normally obtained by introducing ammonia into a hot furnace.

Heat causes part of the ammonia to break down or "dissociate" into molecular nitrogen and hydrogen. The raw ammonia which did not dissociate when it entered the hot furnace is decomposed upon contact with the hot steel being nitrided—forming atomic nitrogen and more hydrogen.

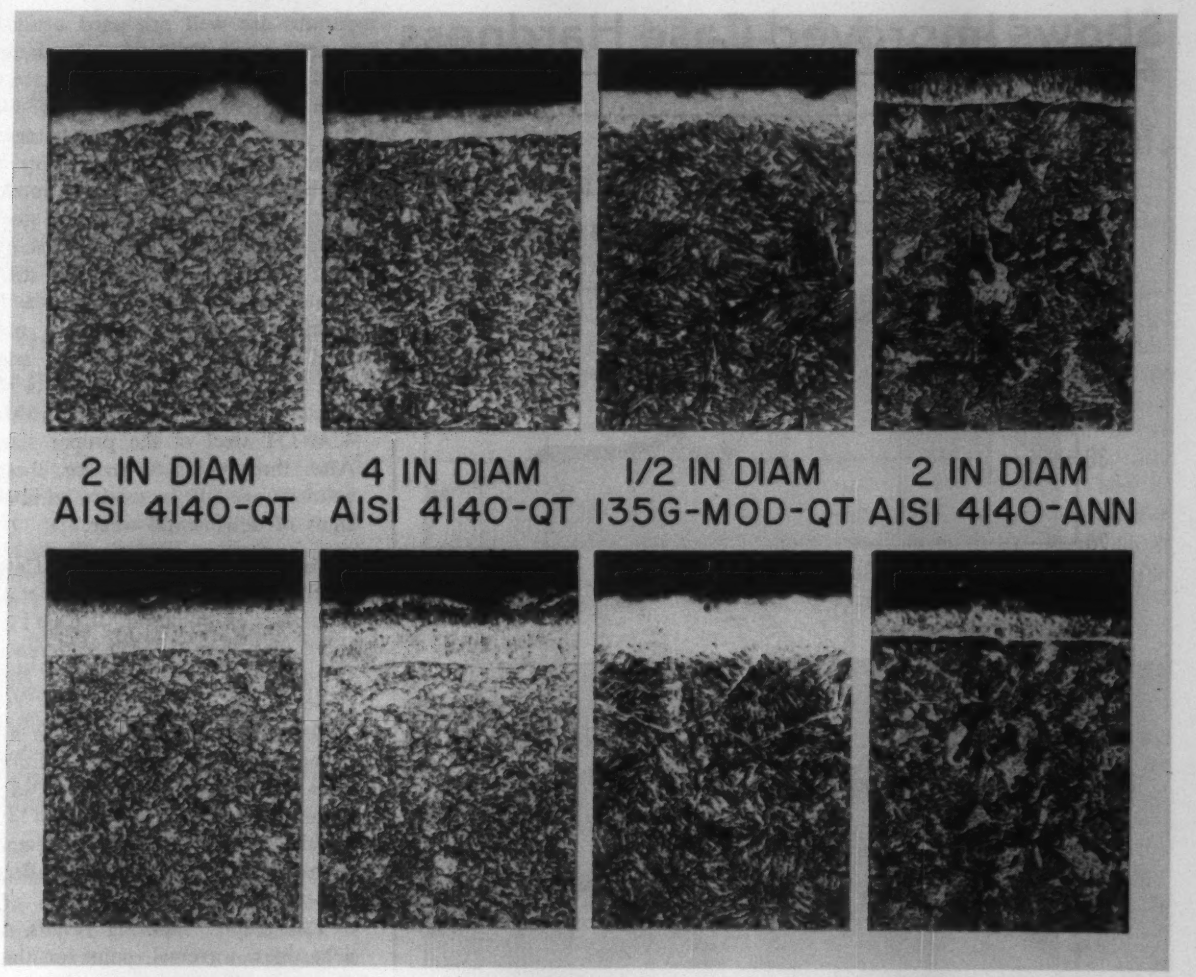
Some of this atomic nitrogen diffuses into the steel and combines with certain alloying elements in the steel to form hard wear-resistant nitrides.

Try Both Processes—Test pieces consisted of annealed 4140 steel, 4140-QT steel (two sizes) and a

Compare Effects of Two Nitriding Processes

	Special Process				Standard Process			
	135G-MOD-QT ½ in. diam	4140-Ann. 2 in. diam	4140-QT 2 in. diam	4140-QT 4 in. diam	135G-MOD-QT ½ in. diam	4140-Ann. 2 in. diam	4140-QT 2 in. diam	4140-QT 4 in. diam
Surface Hardness After Nitriding (R 15-N)	93	83	89	90	93	84	86	88
Case Depth After Nitriding (in.)	0.018	0.015	0.020	0.020	0.022	0.015	0.020	0.020
White Layer Depth After Nitriding (in.)	0.0005	0.0013	0.0004	0.0004	0.0012	0.0015	0.001	0.0017
Center Hardness Before Nitriding (Rc)	20	10	34	24	20	10	34	24

Note: A minimum surface hardness of R 15-N 90 and case depth of 0.017-0.024 in. is required for AISI 135 Mod steel after nitriding according to specifications. QT—quenched and tempered condition. Ann.—annealed condition. Mod.—modified condition.



REVEALS BRITTLE LAYERS: Steels, nitrided by the special process (top), show less of the brittle white nitride layer than those nitrided by the standard process (bottom). Brittle layers crack under impact.

special nitriding steel and AISI 135G-Modified-QT. One group of samples was nitrided using the standard two-cycle process; another group was nitrided using the special one-cycle process.

Hardness measurements were taken before and after nitriding. The data in the table show that, in spite of the difference before nitriding, there is no significant hardness difference among different size samples in 4140-QT. (This result does not agree with the findings of the previous work which stated that surface hardness after nitriding is a function of core hardness prior to nitriding.)

The softest specimen after nitriding was the annealed 4140 steel; the hardest—the special nitriding steel, AISI 135G-Modified, regardless of the process used.

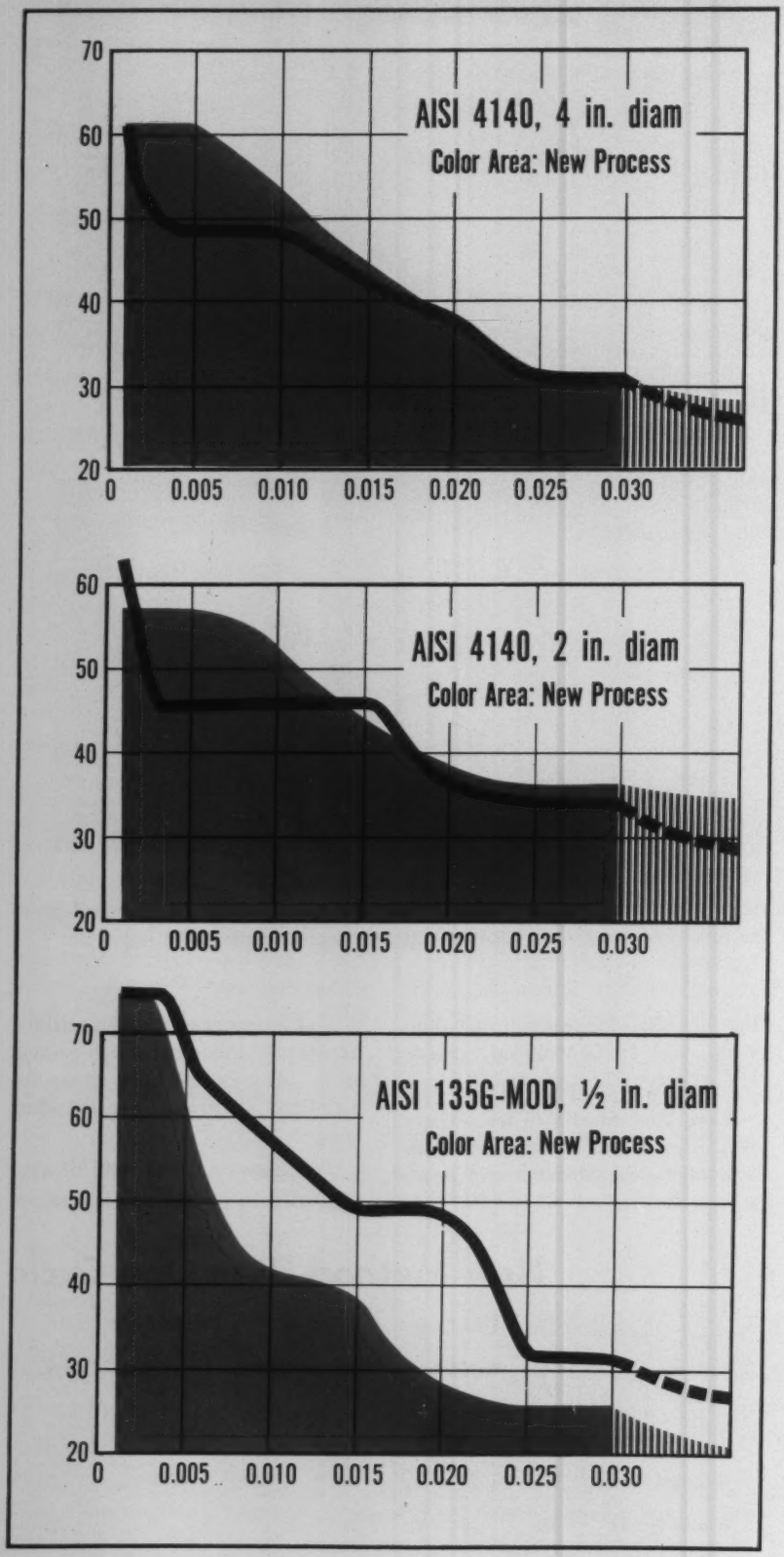
Low-Alloy Steel Will Do—There is no doubt that the nitrided hardness of special nitriding steel is superior to that of 4140-QT. But, it is also apparent that the nitrided hardness of this steel is high enough to be adequate for many wear applications that now use nitriding steel.

For instance, 4140 steel breaker pins used in certain switchgear ap-

New Method Uses One Cycle

	First Cycle			Second Cycle		
	Temp., °F	NH_3 Dissoc., pct	Time, hr	Temp., °F	NH_3 Dissoc., pct	Time, hr
Standard Process	985	25 ± 3	8	1065	45 ± 3	17
Special Process	975	20 – 30	25	....	.....	....

Shows Improved Case Hardness



paratus are well protected against wear by a nitrided surface hardness of 47 Rc. This is quite a bit less than the nitrided hardness, 57-60 Rc, attained by the test specimen.

In another application, heavy 7 in. diam, press guide columns, made from hardened AISI 1095 tool steel wore out prematurely. Replacing with a better quality tool steel would have been too expensive.

Special nitriding steel was not used because of unavailability, and cost problems. The answer was to finish - machine and then nitride 4140-QT steel of the proper size. After three years of service, these columns are still in service without signs of detrimental wear.

Similar Case Depths — Case depths were determined by a metallographic examination. Results show that there is little difference between the two processes in this respect.

Only the specimen that was nitrided in the annealed condition does not meet specifications. It was, therefore, concluded that 4140 should be in the quenched and tempered condition for most effective nitriding.

The graphs, showing results of a hardness traversal, point out that the one-cycle process gives the best case hardening characteristics when using 4140.

Nitride Layer Cracks—The photomicrographs point up the depth of the white nitrided layer. This brittle white nitride layer, although very hard, is normally undesirable because of its extreme brittleness.

Note that the white nitride layers in steels nitrided by the special cycle are much less than those nitrided by the standard cycle. Note, also, that when using the special cycle, 4140 gives the thinnest nitride layer.

What about cost? The standard method uses less ammonia and is, therefore, cheaper. But, as noted above, it gives rise to a thicker white nitride layer. Therefore, whenever possible, 4140-QT steel and the special one-cycle process should be used.

Clever Fixture Aids Machining

Steps Up Production of Cylinder Parts

Special tooling and a standard drilling machine form a cost-cutting team.

This team handles drilling and tapping of three faces of cylinder ends at one time.

▪ Clever tooling helps a standard drilling machine produce ten different types of cylinder end housings. Machining of various faces of three workpieces takes place at the same time. Here's how.

Alkon Products Corp., Hawthorne, N. J., makes pneumatic and hydraulic cylinders. Five cylinder models require ten different end housings. A single drilling machine turns out all ten types of housing parts.

Fixture Holds Three — Each housing requires four holes drilled through its face. The machine drills, taps or counterbores these holes. It drills and taps two more holes in one side of each workpiece. And, it drills and pipe-taps one hole on the opposite side. These operations are simultaneous.

A fixture, mounted on a sliding table, governs all operations. Separate fixtures accommodate each of the five part sizes. Each fixture resembles an H-shaped block and holds three parts.

One part rests horizontally on the fixture's crossbar. The other two parts stand vertically against the legs of the H. Hydraulic cylinders, made by Alkon, hold the vertical parts in position.

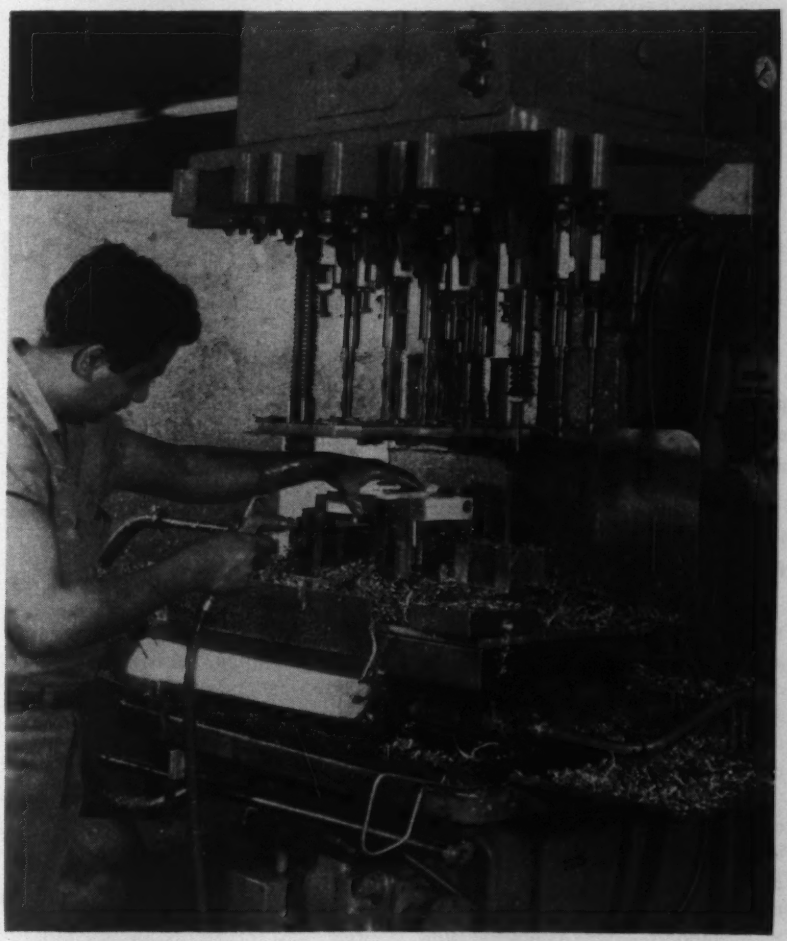
Natural Location — When the housings reach the drilling machine, built by National Automatic Tool Co., Richmond, Ind., they have grooves already machined in them. These grooves fit the completed cylinders. Locating plugs, mounted on each tool fixture, mate with the grooves. This forms a neat, and natural, locating arrangement.

Machining takes place in a two station operation. First station functions include: at number one location, the machine drills a hole for a pipe tap; at location two, it drills four bolt holes; at location three, it drills two holes.

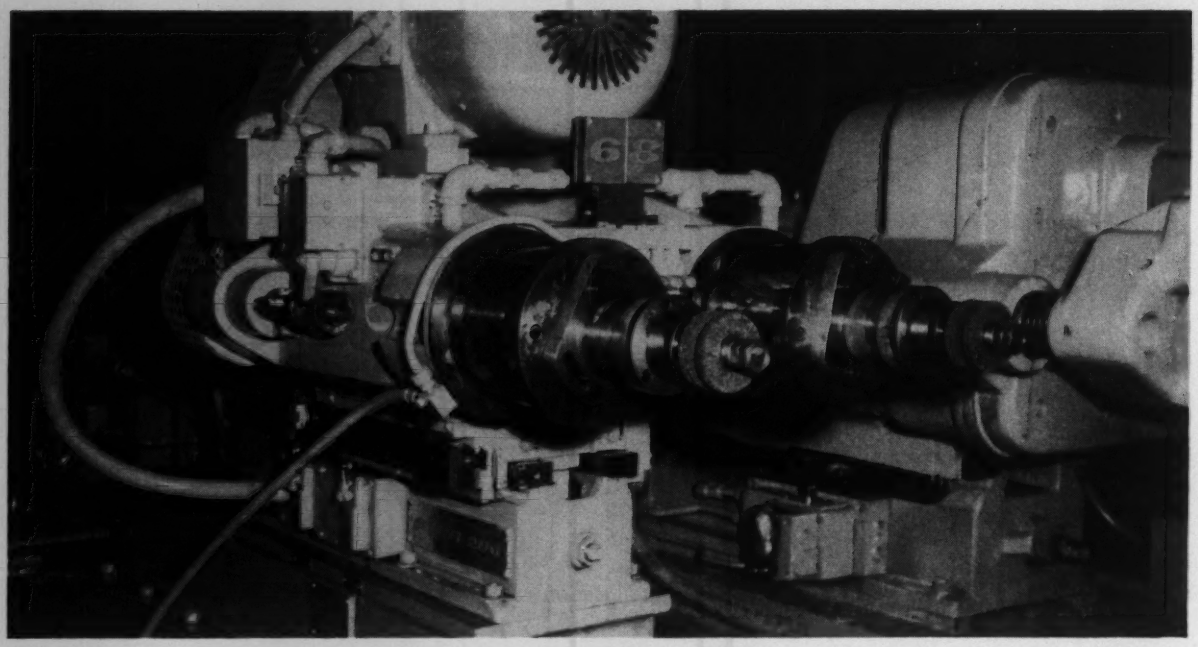
Second station machining produces: a pipe-tap hole at location one; four tapped or counterbored bolt holes at location two; two tapped mounting holes at location three.

Vary Tap Load — Alkon uses only two slide positions for this particular job. The multiple spindle drilling machine has a five position table.

The operator selects either of two feed rates. He controls feed depths as well as motor speeds. Thus, he machines various size parts with different tap loads. This allows complete drilling and tapping operations on a single machine.



SINGLE OPERATOR: An operator loads and unloads tool fixtures. Each fixture holds three cylinder parts in an H-shaped working arrangement.



WIREBRUSHING SWEEP: Rotating wirebrushes, mounted in groups of three, sweep internal cavities.

Transfer Line Tackles Variety In Machining Pump Housings

In addition to getting high precision and high production, a new transfer machine takes on non-machining steps.

With its building-block design, it's flexible enough to permit fast setup changes.

▪ Transfer machines have progressed a long way from the initial concept of drilling holes and doing related operations. Modern units incorporate almost all types of machining methods.

Typical of the new approach to design is a 76-station unit recently installed at Saginaw Steering Gear Div., General Motors Corp., Saginaw, Mich. Designed and built with standard components by Buhr Machine Tool Co., Ann Arbor, Mich., the setup shows how many types of operations can be combined effectively.

Top Efficiency — The palletized transfer machine handles power-steering pump housings through 220 operations. Once housings are mounted in pairs on the pallets, parts are finished at the rate of 300 per hour at 100-pct efficiency.

In addition to normal drilling, boring, reaming, spot-facing, counter sinking and probing, the setup performs these more complex steps: It generates a critical surface with a single-point tool, mills a surface, orients and inserts a babbitt bushing, undercuts three grooves, balances a hole and wirebrushes the grooves.

Ballizing of the pump plunger hole was originally a secondary step performed after the workpiece was removed. By shifting a few operations around — possible because of the unit's building-block design — the ballizing operation was set up on the transfer machine.

Precision Ballizing — Floating tool holders hold the ballizing tools to maintain the extreme hole accuracy in case of slight misalignment of the tools. The tools size the hole accurately and refine its surface.

To remove burrs left by grooving tools, wire brushes rotate at 7140 rpm about their own axes, which in turn rotate eccentrically about the main spindle axis. The brushes, with initial diameters of 2½ in., are mounted in groups of three to correspond to the locations of the grooves in the pump cavity.

Brushes feed into depth where they line up with the grooves and sweep the internal periphery of the

cavity. All grooves are deburred simultaneously.

Compensate for Wear — Like other perishable tools, the brushes are compensated for wear. Their eccentricity increases until diameter is reduced by 1-5/8 in., at which time all three brushes on one arbor are replaced.

Automatic in-process checking is done at various stations by 12 probes to make certain that holes have been drilled. Roving inspectors occasionally check partially finished workpieces when the pallet fixtures are in idle stations. Gage locating steps and buttons in the fixtures reduce the time required for these inspections.

As a safety measure, the inspector actuates a selector switch at the station to prevent the operator from indexing the transfer mechanism.

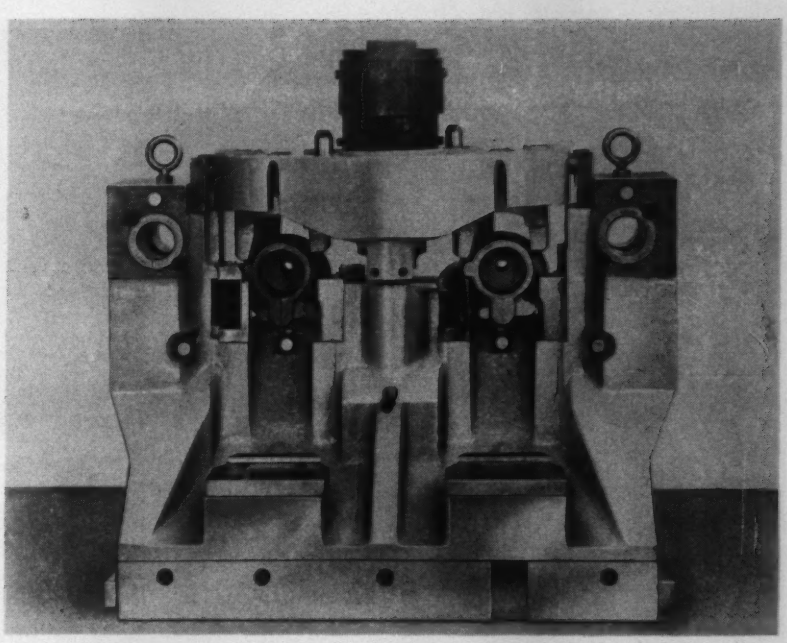
Air Gage for Size — At one station an air gage scans the precision-bored pump-plunger hole for size and roundness. A classifier automatically sprays the pump housing with a small spot of paint of the appropriate color, any one of three, to indicate the relation of gage reading to the specified tolerance range.

An example of process freedom is found at the face-milling station. The face mill feeds hydraulically to the pump housing and mills on an upward feed stroke of the cutter.

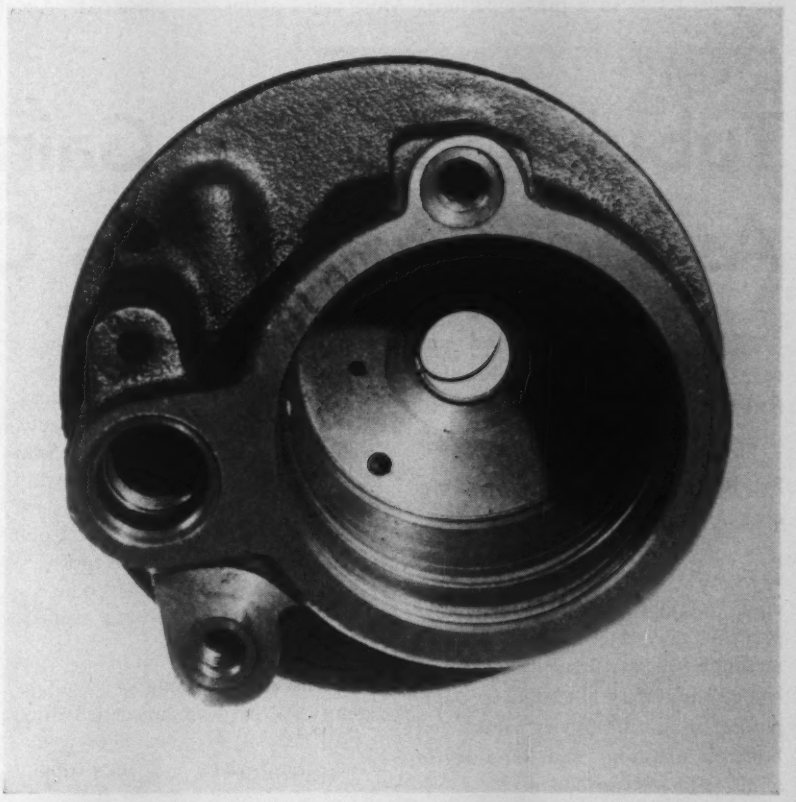
Change gears have been included in these heads so that right feed and cutting speed may be paired for optimum cutting life. This ability to vary the spindle speed provides flexibility for workpiece material changes in the future.

Boring in Pairs—The precision boring operations require almost twice as much time as any other machining operation of this 24-second cycle machine. Rather than double the cycle time, pallets are accumulated, then indexed two at a time through the two stations.

Just before the pallet fixtures are indexed to the unload station, the fixture clamp automatically backs off. Then it rotates 90° so the operator can easily unload parts.



PRECISION MOUNTING: Pivoted clamping in palletized fixture permits full equalization of clamping forces on two housings. Lubricant injector (center) couples to lubricant supply after each circuit of machine.



COMES OUT FINISHED: Transfer line has inserted babbitt bushing in pumpshaft hole. Other steps completed in addition to standard drilling: single-point generated body face, milled front surface, wire-brushed grooves in pump cavity, and ballized pump-plunger hole (left).

RIVET IN PATTERN: A cluster of six pneumatic machines rivets in a preset pattern. Most users prefer pneumatic equipment when rivet setting operations are clustered. Absence of a flywheel saves space.

Tubular Riveting Gains Favor As Industry Studies Cost

High-speed machines feed and set tubular and semi-tubular rivets to speed assembly work.

Flexibility is the byword. Product design changes seldom make the equipment obsolete.

▪ Many companies, that used to view riveting as an old fashioned process, now use modern riveting methods to speed assembly work.

Led by the automotive companies, major industries automated both fabrication and production areas. This overloaded their assembly lines. End result was a hard look at assembly practices with the idea of automating them also.

Engineers decided that if an ideal solution exists, it depends on a number of stations: Each incorporating a simple assembly tool. Riveting fits this picture very nicely.

As a result, the Tubular & Split Rivet Council, whose membership consists of leading producers of tubular and semi-tubular rivets and rivet setting machines, reports a general optimism among producers. This optimism hasn't been equaled since the early 1940's.

Automated Riveting — What accounts for the rivet upswing? First of all the use of solid rivets is decreasing. Tubular and semi-tubular rivets are taking over the field. Although the solid rivet provides an inexpensive fastener, its in-place cost is high. This is because it's inserted in the work by hand.

Automatic mechanisms on high speed machines feed and set tubular and semi-tubular rivets. This patterns riveting to highly mechanized assembly methods. It also suits the job shop and short run work. Flexibility in shifting riveting from one extreme to another becomes a matter of a few simple changes in equipment.

About the time nation-wide automation took place, the rivet making industry began a major program of modifying and redesigning its equipment. Improved methods of actuation were developed. Pneumatic as well as hydraulic drives were improved.

Group Installation—Most users prefer pneumatic machines when rivet setting equipment is grouped

and clustered. These machines have a narrow configuration and clean design. This permits close installation. So does the absence of a flywheel.

As single units, the machines handle materials that vary quite a bit in thickness from part to part. The machine's pressure stroke offers a degree of control that's hard to match in electrically driven, mechanically actuated models. And for this reason, pneumatic units serve to fasten fragile assemblies.

Conversely, mechanical machines are popular because of their fast cycling time. Their stroke is sharp and quick. This produces a good set. Sometimes, mechanical drives are designed and sized to be comparative with equivalent hydraulic or pneumatic models.

Rivet Feed—Riveting can be performed in a single spindle or in a double spindle machine. The latter models often have fixed center-to-center distances. In the single spindles, these distances are adjustable to correspond with changes in design or production requirements.

Most machines have rotary or blade type hoppers. They also usually incorporate track devices to feed the rivet to the jaws.

Automation sparks many work saving extras. Auxiliary equipment includes tables that operate on a time cycle. These tables rotate parts from station to station. They also eject the finished assembly onto conveyors or into tilt boxes.

Slide fixtures are also common. These fixtures position the parts and trip the machine when moved into the riveting position.

Product Changes — For the job shop or the short run production cycle, a single spindle, setting machine is the most suitable. A change in product design seldom makes the equipment obsolete.

Setting machines aren't the entire story. There's a number of other reasons for the current trend to riveting.

Riveting adapts itself to nonmetallic as well as metallic materials. In the use of plastic to metal components, riveting fills the need for a high-speed, low-cost assembly method. There's little likelihood that this trend will lessen.

Many Uses — Rivets perform multiple functions: They join an assembly; act as electrical contacts; perform as pivots or stops; function as spacers; and they even provide decorative appearances.

An almost unlimited number of standard and special types of rivets are available. Dimensional standards are available for semi-tubulars with oval, struss, or flat countersunk heads. Other standards are being developed.

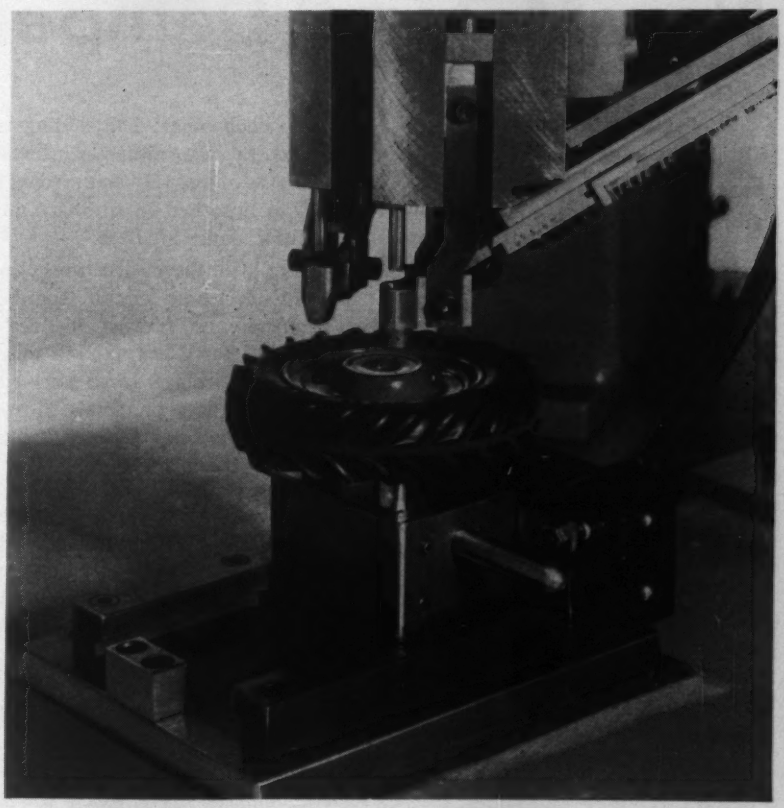
Although most people prefer standard rivets—from the viewpoint of delivery, cost, tooling and inventory—there are times when a special is justified. If you can improve or simplify product design, shorten assembly time, or make the fastener serve a dual function; then you justify special rivets.

Critical Stresses — Semi-tubular rivets exhibit the same resistance to shear as solid rivets. After setting, their shanks become solid. This offers a full cross section to shear loads.

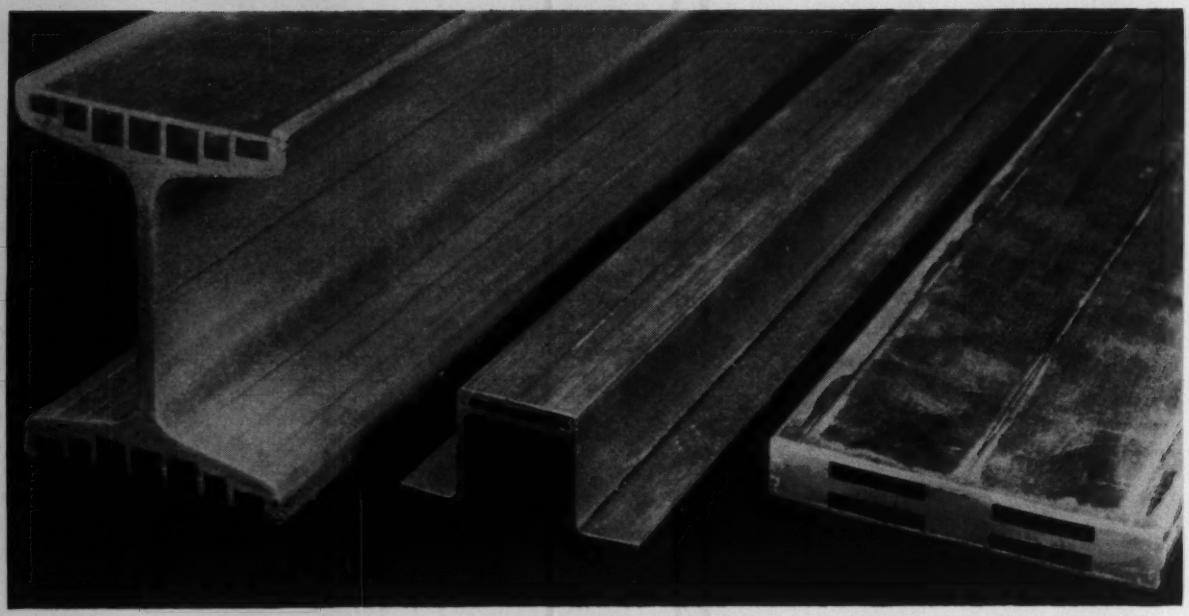
Tension loads are more critical. Resistance to tension is a function of many factors. These factors include clinch, rivet diameter and type of material.

Since the fasteners are set in a cold state, their resistance to tension depends upon the homogenity of the rivet material and the stress imparted during forming and setting. Overloads in tension deform the set and cause loosening or failure.

However, once size and type are decided upon, the user can rest assured that joint quality remains uniform. Defective joints are easily spotted. Flaws or breaks in a pattern become readily apparent. There's no need for costly inspection devices. The machine operator performs all necessary inspection.



CLOSE QUARTERS: Narrow configurations and a clean design allow three pneumatic heads to operate on a single workpiece, at the same time.



REDUCES VIBRATION: Viscoelastic material absorbs dynamic energy in various structural aluminum shapes.

New Material Dampens Vibration

A viscoelastic medium actually built into structural members, reduces the hazards from vibration and shock.

Initial use is in aircraft, missiles and electronics.

▪ The failure of more than one missile or aircraft can be traced back to problems in vibration. Now a new concept in structural design offers a solution to this space age problem.

The new design builds high damping traits right into the basic structure. Certain shapes, like sheet and rectangular beams, are laminated, separated by the new viscoelastic damping material, called Rigidamp. The same effect is achieved in I-beams, channels and angles from cellular rather than laminar construction.

In flexing under the impressed vibration, the laminations slide relative to each other. This sliding is impeded by the viscoelastic material. And most of the resonant energy is absorbed in straining the viscoelastic layer in shear.

Where will these structures apply? In electronic circuit boards, electronic frames, shelves, dust covers, aircraft parts, test fixtures, missile skins and relays. Most work to date has been done on metals. However, the design is equally suitable for plastic structures.

Safer Flight—The new structures have been developed by Barry Controls, Inc., Watertown, Mass. Engineers at Barry consider the aircraft and missile industry a prime target for its damped structures. Here, they are expected to reduce the serious problems of structural failure due to fatigue.

Structures damped with viscoelastic material have much lower resonant responses than conventional structures. Take the case of channels and I-beams, for instance.

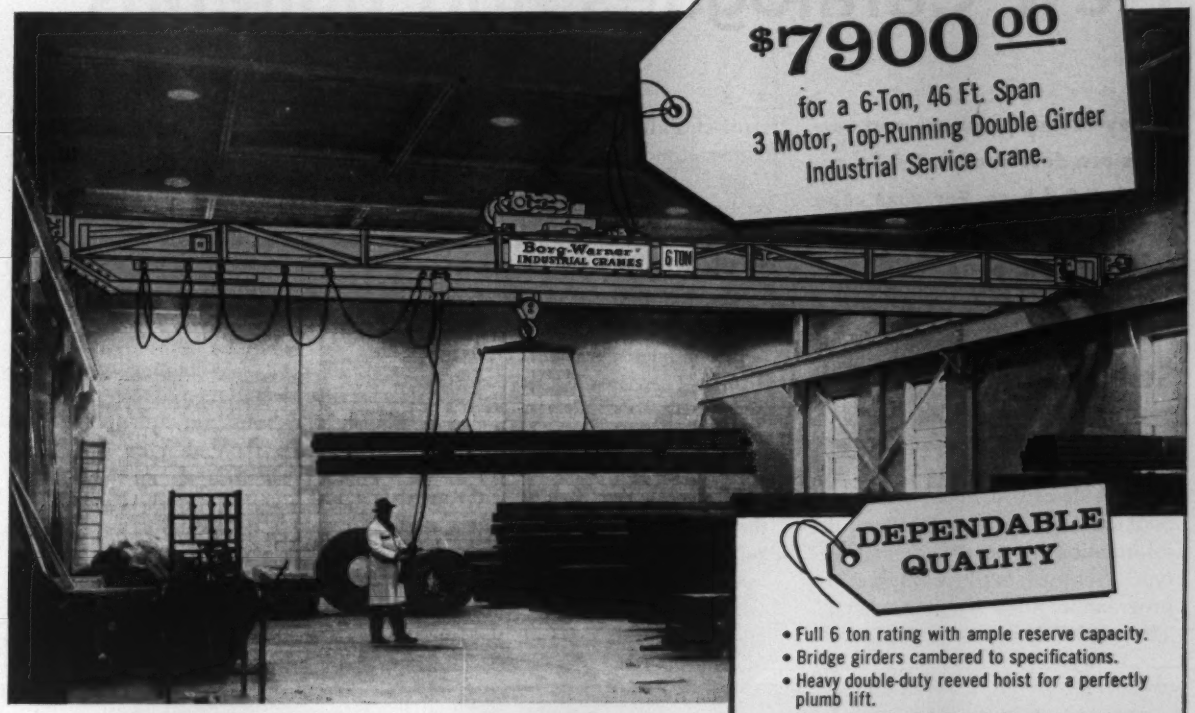
Damped structures of a specific nature are amplified five to ten times the excitation vibration. Conventional structures, on the other hand, might amplify some 60 to 300 times at resonance.

Easily Formed—Barry engineers point out that the special damped materials can be formed and fabricated just as easily as the metals or plastics used. A complete damped structure, however, requires special care to construct.

For this reason, Barry will not market the damped structural members as materials. Instead, the company will provide design and fabrication services for structures to solve specific dynamic problems.

Ervin Pietz, president of Barry Controls, observes that there's no reason why this method can't be applied to any type of structure. It fulfills a need wherever vibration problems are extreme.

Now you can afford Borg-Warner Quality in your next overhead Crane...



$7900.00
for a 6-Ton, 46 Ft. Span
3 Motor, Top-Running Double Girder
Industrial Service Crane.

DEPENDABLE QUALITY

- Full 6 ton rating with ample reserve capacity.
- Bridge girders cambered to specifications.
- Heavy double-duty reeved hoist for a perfectly plumb lift.
- Heavy duty steel bridge and trolley wheels.
- All welded jig bored, jig assembled end trucks.
- Long life precision ball and roller bearings throughout.
- Precision assembly of girders and end trucks with fitted bolts in reamed holes.
- Outrigger machinery girder construction.
- Magnetic bridge brake.
- Heavy duty gear reduction bridge drive.
- Fluid coupled bridge and trolley drives.
- Full magnetic push-button floor control.

ADVANCED DESIGN

The crane illustrated is a typical double girder installation. Span may be shorter or longer with greater or smaller capacity and for lighter or heavier duty, intermittent or continuous. Whatever your overhead handling requirements Borg-Warner Industrial Cranes can supply your needs with quality equipment at a price you can afford!

Advanced engineering and standardization make...

Borg-Warner Industrial Cranes

BETTER VALUES at LESS COST

Borg-Warner crane engineers and production men have taken a new look at the entire line and come up with important economies through extensive use of standardized interchangeable components. Because these savings are passed along to you, you get more crane for your money when you specify Borg-Warner Industrial!

Efficient overhead materials handling pays off. You get more overhead storage space than fork truck handling provides. You benefit from aisles and work areas uncluttered by floor-type handling equipment. You can reach all areas under the crane, the full length of the runway.

If you are planning a new factory building, an addition to present facilities or a modernization program, it will pay you to look to Borg-Warner Industrial Cranes for the best values in overhead materials handling equipment.

Industrial CRANES — INGERSOLL PRODUCTS — B-W — BORG-WARNER

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Make it better.

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Export Sales: Borg-Warner International, 36 South Wabash St., Chicago 3, Illinois

New Catalogues and Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 107.

Search Writer

An integrated system, providing an economical method for searching a magnetic tape file for a particular item, is described in an eight-page booklet. After locating the item, the information is then automatically typed; consequently, computer or programmer time is not consumed. The system can also be used as an error-checking interrogator. (Remington Rand, Div. of Sperry Rand Corp.)

For free copy circle No. 1 on postcard, p. 107

Welding Applications

Successful applications of welding electrodes and wires is presented to the reader in a new eight-page folder. (The McKay Co.)

For free copy circle No. 2 on postcard, p. 107

Grouting Practices

How to avoid shrinkage through the use of a non-shrink grout is the subject of a 16-page booklet. The booklet reports on common methods of grouting different types of equipment, mixing and placing of grout, and cold and hot weather grouting. Also contained, is information on recommended mixes and estimating tables. (The Master Builders Co.)

For free copy circle No. 3 on postcard, p. 107

Grease Cartridges

A new, easy-loading grease cartridge is packed with a multipurpose lubricant. It fits all cartridge type grease guns and lubricates without mess and waste. (Gulf Oil Corp.)

For free copy circle No. 4 on postcard, p. 107

Oscillating Grinder

Details on an oscillating electrolytic grinder is included in a bulletin. Featuring a large wheel and table, its enlarged capacity widens the scope of this method of carbide tool grinding. Diamond wheel consumption is reduced 80 to 90 pct. (Hammond Machinery Builders, Inc.)

For free copy circle No. 5 on postcard, p. 107

Sliding Gate Seats

Low-flow, sliding gate seats, for regulators and control valves, suit individual requirements. The self-lapping and self-cleaning gate seats are stainless steel with industrial hard chrome finish. (OPW-Jordan Corp.)

For free copy circle No. 6 on postcard, p. 107

V-Belt Drives

Information on a drive which reduces overall drive dimensions by as much as 50 pct is covered in a 36-page bulletin. The drives save up to 25 pct in weight and up to 30 pct in cost over conventional V-belt drives. The bulletin includes drive-selection tables for stock and

Every screw machine man NEEDS this basic thread data....
VOL. V THE EASTERN MACHINE SCREW CORPORATION 140 TRUMAN ST. NEW HAVEN CONNECTICUT
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THE EASTERN MACHINE SCREW CORPORATION • 21-41 Barclay Street New Haven, Conn.

non - stock sheaves, horsepower tables, installation instructions, and other information pertinent to the drives. (T. B. Wood's Sons Co.)
For free copy circle No. 7 on postcard, p. 107

Thermocouple Wires

Long recognized as the most reliable materials for temperature sensing elements, platinum metals offer high melting points, resistance to corrosion, stability in calibration and accuracy over a wide temperature range. A brochure assists users in selecting the material best suited for their purpose. (Engelhard Industries, Inc.)
For free copy circle No. 8 on postcard, p. 107

Accurate Meter Relays

Specialized expanded scale, accurate meter relays are described in a 12-page catalog. Dimensions, prices, typical circuitry, and ordering specifications are contained in the catalog. (Assembly Products, Inc.)
For free copy circle No. 9 on postcard, p. 107

Finishing Methods

Abrasive finishing methods for stainless steel and steel are presented on a data sheet. Detailed recommendations for producing selected finishes, description of finishes, abrasive compound recommendations, wheel speeds, and types of buff, with a special section on blending mill finishes are contained on the sheet. (The Lea Mfg. Co.)
For free copy circle No. 10 on postcard, p. 107

Steel Equipment

Illustrated in a 92-page catalog are steel equipment products for business, industry, institutions and homes. It contains product views, specifications and installation illustrations. (Lyon Metal Products, Inc.)
For free copy circle No. 11 on postcard, p. 107

Multi-Purpose Slings

Slings comprised of synthetic webbing are described in a brief folder. The slings, made of nylon, dacron, or polypropylene, are avail-

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STEELS, INC.
THE 52100 HOUSE
UNION, NEW JERSEY · WETHERSFIELD, CONNECTICUT
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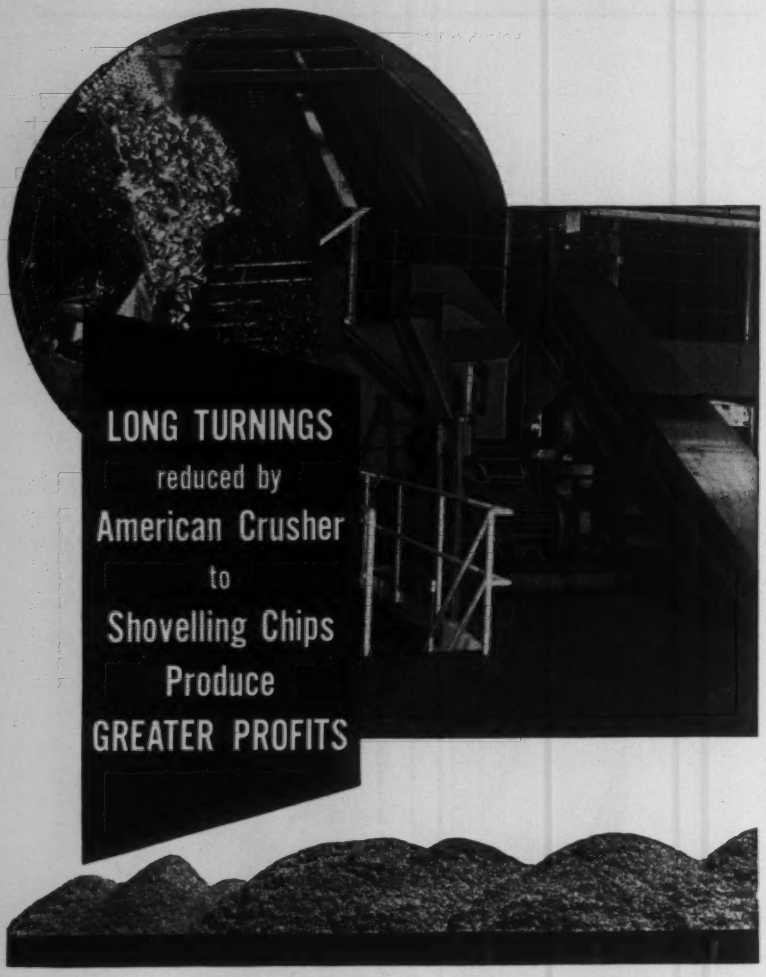

American Metal Turnings Crusher

. . . increases profits . . . improves handling

An almost fully automatic chip salvage system, with an American Metal Turnings Crusher at its heart has increased profits, saved space, and improved housekeeping at a ball bearing plant, conveyors service two rows of automatic screw machines and feed a cross-over conveyor. The cross-over conveyor feeds turnings directly into an American Metal Turnings Crusher which reduces the turnings to uniform sized chips. From the crusher chips are conveyed to a hopper to be periodically discharged into a chip-wringer to reclaim cutting oil. Dry chips drop into a discharge hopper and feed into an air duct which pneumatically conveys the chips to a storage bin at the rail siding.

Literature on American Metal Turnings Crushers is yours for the asking.

American PULVERIZER COMPANY

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

1439 MACKLIND AVE. ST. LOUIS 10, MO.

FREE LITERATURE

able in five styles with three types of hardware for various applications. Also enclosed are charts listing widths, thicknesses, breaking strengths, and safe working loads. (American Manufacturing Co., Inc.)

For free copy circle No. 12 on postcard, p. 107

Hole Punch Units

Dimensional drawings of seven standard models appear in catalog, illustrating punch units for round and shaped holes. Also described are corner and vee notching units. These units handle up to ⅛ in. thick mild steel. (Punch Products Corp.)

For free copy circle No. 13 on postcard, p. 107

Lock Nuts

A complete line of spring tempered steel lock nuts is shown in a 20-page catalog. Design details, locking principle, advantages, typical appplications, dimensions and load ratings are given. (The Palnut Co.)

For free copy circle No. 14 on postcard, p. 107

Leak Testing

Detailed instructions on use of halogen leak detectors are contained in a six-page brochure. The detectors are used to find leaks in enclosures that can be pressurized. Applications, system preparation, and calibration are some of the items discussed in the folder. (General Electric Co.)

For free copy circle No. 15 on postcard, p. 107

Dock Boards

Engineering data and charts, for specifying magnesium dockboards and ramps to fit all rail and truck uses, are available in a brochure. Instructions for determining axle capacity, width and allowances, crown or bend degrees, underclearances, locking range, span sizes, and other essential information is contained. (Magnesium Products of Milwaukee)

For free copy circle No. 16 on postcard, p. 107

they're new! VICTOR Yellow Tang quality files...

Latest Addition to the big VICTOR Line

What do **you** look for in a new product? Precision workmanship? Improved performance? Guaranteed dependability? An established brand name? You'll find all four in new VICTOR "YELLOW TANG" Files.

Individually checked and tested before they leave the factory, new "YELLOW TANG" quality files are the latest addition to the fast growing line of outstanding VICTOR metal cutting tools.

Your local authorized VICTOR distributor will gladly furnish you with detailed information on new "YELLOW TANG" Files. Contact him today. He's ideally equipped to fill **all** your cutting tool needs.

VICTOR

VICTOR Saw Works, Inc.

METAL CUTTING PRODUCTS

Middletown, N. Y.

POWER HACK SAW BLADES
HAND HACK SAW BLADES
HACK SAW FRAMES
BAND SAW BLADES
HOLE SAW BLADES
FILES

INDUSTRIAL DISTRIBUTOR

2020

Flash butt-welding titanium extruded section eliminates 38 lbs. of material...plus machining

When an extruded shape closely approximates the finished cross-section of a circular part, you can save money—particularly where expensive materials are involved. This titanium ring was circular formed and flash butt-welded from the section shown above. Material savings were $262.00 per ring, plus $46.00 on machining.

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and complete machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 120 DIETZ ROAD • WARREN, OHIO

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Industrial Hose

Hose, fittings, self-sealing couplings, and related products comprise the descriptive information in an industrial catalog. Specifications concern products used on general industrial applications. A hose selector chart and instructions for assembling hose lines are also provided. (Aeroquip Corp.)

For free copy circle No. 17 on postcard

Power Rectifiers

Flexible silicon power rectifiers, which can be built to supply almost any desired voltages and currents, are described in an eight-page bulletin. (I-T-E Circuit Breaker Co.)

For free copy circle No. 18 on postcard

Build with Aluminum

Comprehensive information, compiled to assist architects in the selection of aluminum alloys and surface finishes for a vast array of building industry applications, appears in a 20-page booklet. (Olin Mathieson Chemical Corp.)

For free copy circle No. 19 on postcard

Heat Exchanger Tubes

Nuclear quality, Inconel heat exchanger tubing is described in a specification that outlines the quality and the technical requirements of the tubing. (Superior Tube Co.)

For free copy circle No. 20 on postcard

Discharge Valve

A rubber diaphragm, peristaltic type, discharge valve makes it possible to handle coarse abrasives such as catalysts, pellets and other odd-shaped materials unable to pass through conventional rotary valves. The valve has no internal wearing metallic parts. Its rubber diaphragms are easily replaced. (U. S. Hoffman Machinery Corp.)

For free copy circle No. 21 on postcard

Battery Systems

An eight-page, illustrated bulletin describes a battery system. Specific data on various models lists electrical, physical, and application characteristics. Discharge curves of these space- and weight-saving batteries are also included. (Yardney Electric Corp.)

For free copy circle No. 22 on postcard

Motor Controls

Charts for magnetic and manual starters give horsepower, motor speed, heater size, heater ampere ratings and enclosure choices. Style numbers and list prices are also provided in one easy-to-read table. (Furnas Electric Co.)

For free copy circle No. 23 on postcard

Boring Bars

Complete engineering and specification data are contained in an illustrated eight-page booklet describing standard boring bars. The five different styles of bars use square or triangular throw-away carbide inserts. (Wesson Co.)

For free copy circle No. 24 on postcard

Surface Finish

A pocket-size, 12-page surface-measurement reference manual contains excerpts from the ASA standard. Classification of surface characteristics, stylus-type measuring instruments, precision reference specimens, roughness width cutoff, and notes on control of surface roughness is covered. (Brush Instruments, Div. of Clevite Corp.)

For free copy circle No. 25 on postcard

Recorder Systems

A four-page sheet describes recorders and recorder control stations which continuously indicate and record the output of associated

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FREE LITERATURE

transmitters or transducers. All contain an integral transistorized power supply that makes possible true, two-wire transmission from field mounted devices. (Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 26 on postcard

Air Directional Valves

A catalog lists 1172 different air directional valves. Fifty-five valve operators and nine basic valves are shown with dimensions, capacity, weight, and J.I.C. symbols. (Industrial Products Div., Westinghouse Air Brake Co.)

For free copy circle No. 27 on postcard

Gas-Engine Compressor

Fully described and illustrated are the crankcase, bed section, pistons, crossheads and running gear of a new line of gasoline engine compressors. Horsepowers range from 660 to 1320 bhp. (Clark Bros. Co.)

For free copy circle No. 28 on postcard

Heavy Duty Chain

Complete details on heavy-duty roller chain is given in a technical folder. The chain will find acceptance in industries where heavy loads must be moved in the presence of foreign materials. Sizes available and sprockets to be used with the roller chain are mentioned. (Atlas Chain & Mfg. Co., Subsidiary of Prudential Industries)

For free copy circle No. 29 on postcard

X-Ray Techniques

Ten basic X-ray techniques, used for industrial quality control and scientific research, appear on a wall chart. (Phillips Electronic Instruments.)

For free copy circle No. 30 on postcard

Steel for High Heat

The service of chromium-molybdenum-vanadium steels at elevated temperatures is discussed in a folder. Reporting on the resistance of Cr-Mo-V steels to graphitization while exposed to operation at high temperatures, the folder also includes chemical composition and strength value details. Test reports are also given. (Vanadium Corp. of America)

For free copy circle No. 31 on postcard

Heavy Duty Lathe

A fully-illustrated eight-page booklet contains complete engineering details and specifications, and a discussion on the new features of the lathe. (Nebel Machine Tool Corp.)

For free copy circle No. 32 on postcard

Terminal Blocks

Especially prepared for design engineering, production and purchasing personnel, a 12-page illustrated booklet features sectional terminal blocks, giving actual-size illustrations showing modular construction. Further information also covered consists of one-piece terminal blocks, solderless connectors, and one-piece squeeze type connectors for non-metallic sheathed cable. (Buchanan Electrical Products Corp.)

For free copy circle No. 33 on postcard

Rectifier Bulbs

Descriptive and theoretical data, on the use of Tungar bulbs in rectifier circuits, appears in an eight-page brochure. These bulbs provide noise-free power supplies with low-voltage drop and high efficiency. (General Electric Co.)

For free copy circle No. 34 on postcard

Analog Computers

A line of general and special purpose analog computers and accessories is described in a four-page brochure. Also presented is a discourse on an advanced system in computer technology which incorporates the repeating capability of digital computers while maintaining the speed and ease of use of analogs. (Computer Systems, Inc.)

For free copy circle No. 35 on postcard

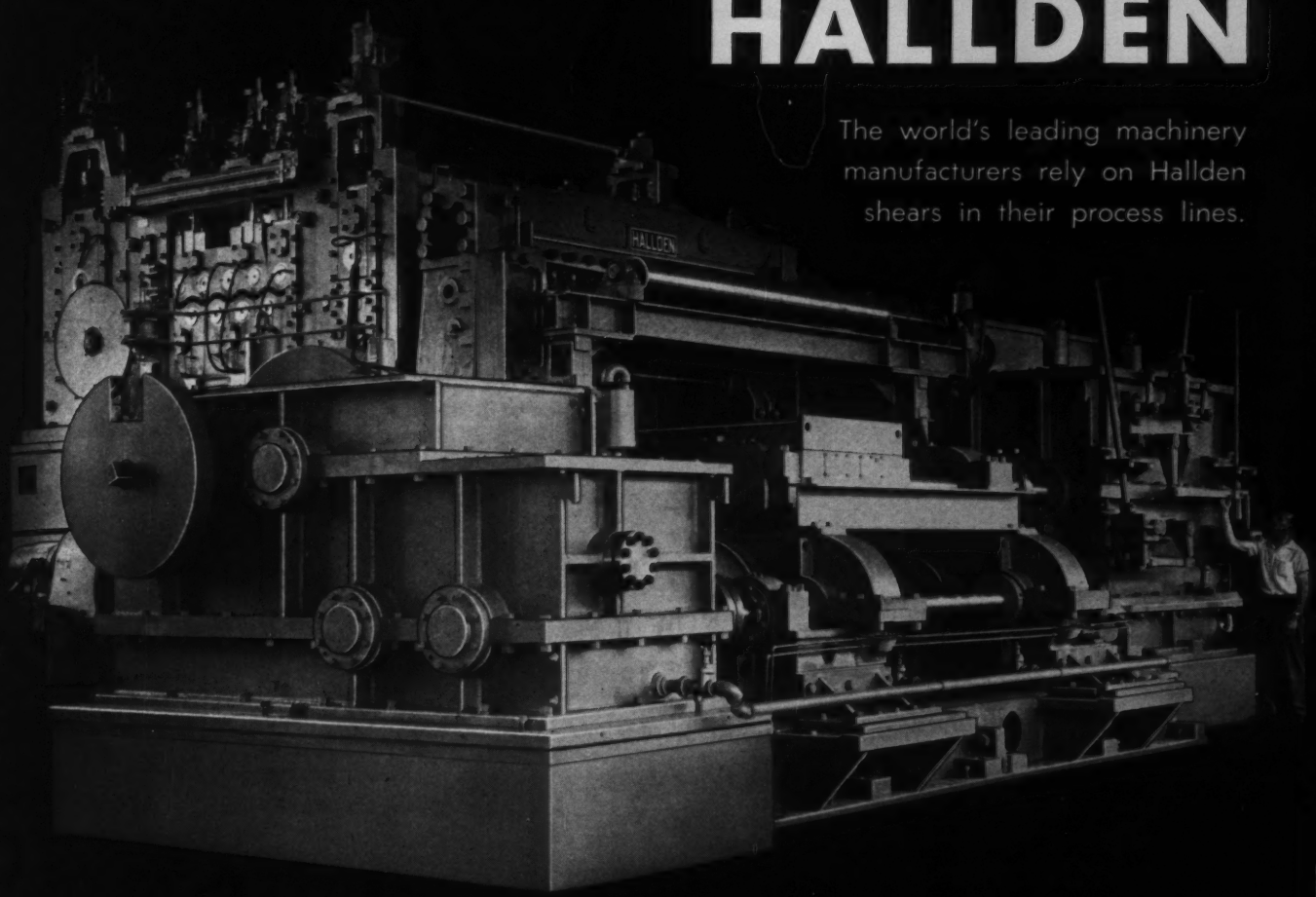
550,000 POUNDS OF PRECISION

The Guillotine Shear's superior cut on heavy gauges, synchronized on the fly

Another Hallden First — type 76 Guillotine Flying Shear, the world's largest, for continuous strip shearing — up to 5/8" thick, 100" wide aluminum — at ***two cuts per second.*** This new Hallden installation can cut mild steel up to 3/8" thick and 90" wide, with cut lengths infinitely variable up to 48 feet. Change of cut length and synchronization may be made while the Shear is in operation. For every high-production shearing application consult the shearing specialists.

HALLDEN

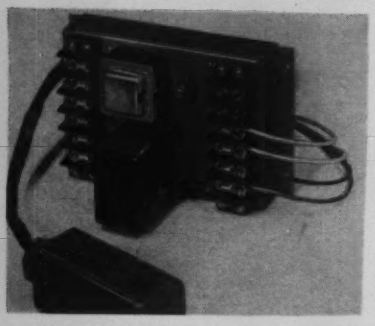
The world's leading machinery manufacturers rely on Hallden shears in their process lines.



THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co., Ltd., Bedford, England

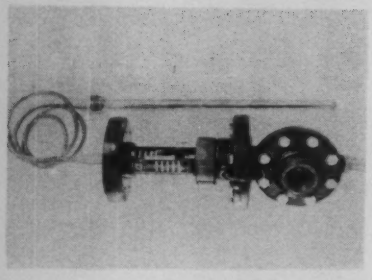
New Materials and Components



Switch Resists Unfavorable Conditions

A proximity switch operates under unfavorable environments such as those created by oil, grit, dirt, sludge, or vibration. The switch consists of a sensor and a separate transistorized amplifier. The sensor, detecting magnetic material without physical contact, measures 1⅝ x 1⅝ x 3¾ in.; the amplifier measures 4½ x 7 x 4½ in. The unit has an adjustable sensitivity range of ⅛ to ½ in. The switch is designed for use as limit, interlock, counter, or indicator sensors. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

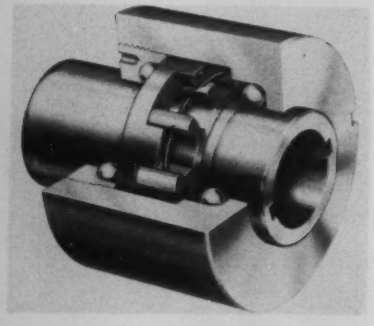
For more data circle No. 36 on postcard, p. 107



Temperature Valve Controls Rugged Pressures

Piloted temperature control valves, in ¼- to 2-in. sizes, provide sensitive control of rugged pressure drops. Sliding gate seats are self-lapping and self-cleaning. The seats provide positive shut-off during lock up and accurate regulation during operation. Capacities are from 12 to 6600 lb of steam per hour. The valves handle water at rates of 1 to 175 gpm. They are suitable for pressures to 250 psi and temperatures to 500°F. Wide use includes temperature control of heating and cooling systems. (OPW-Jordan)

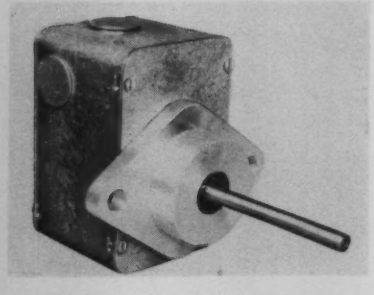
For more data circle No. 37 on postcard, p. 107



Torque-Transmissions for Varied Applications

Featuring two opposing sets of sprags which block reverse torque feedback to the input shaft, a torque-transmission device operates both clockwise and counterclockwise to drive, over-run and backstop. Versatility includes reversing and two-speed drive applications. By gearing a low-speed reversible motor to the outer race and a high-speed motor to the input shaft, driving torque may be transmitted to the output shaft at two speeds—or reversed. A multiple number of sprag contact surfaces engage the outer race when torque feedback or backstopping conditions are present. Slight rotation of input shaft disengages the sprags. (Formsprag Co.)

For more data circle No. 38 on postcard, p. 107



Speed Detectors Incorporate Steel Housings

Speed detecting switches are furnished in stamped steel boxes, complete with wiring knockouts and flanges for external mounting. Each box measures 2¾ x 4½ x 3 in. Speeds from 500 to 4000 rpm can be detected. The detectors are activated by speed alone. They are independent of voltage or other environmental conditions. Unit life is over 1,000,000 cycles of uniform operation. Recommended uses include: overspeed and underspeed detection, signalling, sequencing and protection of equipment. Torq Engineered Products, Inc.)

For more data circle No. 39 on postcard, p. 107

Just suppose YOU cut reject costs 50%

Yes, you'd certainly look good to your company and associates... and benefit your company. And it's not so wild a dream, either.

Many companies have cut the costs of rejects and re-work much more than 50%. Simply by wisely planned use of Magnaflux Testing Systems to find cracks and other defects in materials and parts—before time, money and man-power are wasted in useless later processing.

Savings don't stop there, either. Usually they also include increased production capacity, better maintained delivery or assembly schedules, satisfied customers who stay loyal against competitors' coaxings. All of which is very good for anyone with a personal stake in his company's future.

Best part of it is, *you* don't have to risk a thing. Magnaflux has been helping companies big and little to save money and assure reliable standards for over thirty years. You can be sure of getting the benefits you expect—whether to meet tight specifications, job lot or modest inspection standards . . . test castings, weldments, stampings or forgings . . . even for hardness, conductivity and alloy tests. Leading engineers, production managers and testing laboratories back your judgement in choosing a Magnaflux Test System, all sold on a money-back guaranteed basis.

This year many delayed capital appropriations will come up for decision. *Can you really afford any longer to get along without savings from a Magnaflux Test System?* Ask to have a Magnaflux engineer check your needs with you . . . then make a Magnaflux Test System a "must have" item.

High speed inspection of forged universal yoke shafts using conveyorized Magnaglo unit. Under black lights cracks become glowing signals impossible to miss and easy to judge.

Many Magnaflux Test Systems:

MAGNAFLUX-MAGNAGLO to test magnetic materials for cracks, seams, etc.
ZYGLO for non-magnetic and other materials—cracks, leaks, etc.
SONIZON Ultrasonic Thickness Measuring.
STRESSCOAT to find and measure stress on parts—overall.
MAGNATEST electronic testing for hardness, conductivity, alloy, proximity, and many more.
And still other methods and techniques, some completely new.

MAGNAFLUX CORPORATION
A Subsidiary of General Mills
7302 West Lawrence Avenue, Chicago 31, Illinois
New York 36 • Pittsburgh 36 • Cleveland 15
Detroit 11 • Dallas 35 • Los Angeles 22

The Hallmark of Quality in nondestructive test systems

DESIGN DIGEST

Air Cylinders

The use of molded nylon as a body material, instead of aluminum, offers reduced manufacturing costs of air cylinders, while maintaining a high standard of ruggedness and porosity. The shape of the cylinder permits application of air where space is a limiting factor. Special

treatment of the nylon body allows usage under pressure. The nylon cylinder is ideal for light duty applications such as metalworking, machine-tool setups, and other low-pressure applications. (Fabco)

For more data circle No. 40 on postcard, p. 107

Bonding Material

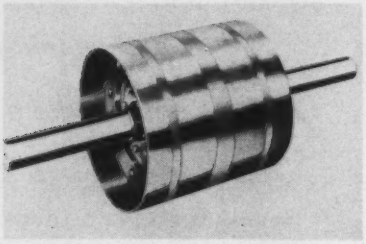
A bonding material is adaptable to both sandwich structures and to metal-to-metal bonds. Supplied in

rolls 18 in. wide, the material can be cut and trimmed to the shape of the areas to be bonded. The adhesive is dry, pliable, and easy to handle at room temperature, but at elevated temperatures, it momentarily softens and flows, wetting the bonding surfaces. Continued application of heat and moderate pressure cures the adhesive into a tough high-strength film, without releasing any solvents or condensation products. (Narmco Resins & Coatings Co.)

For more data circle No. 41 on postcard, p. 107

Magnet Pulleys

Permanent magnet pulleys provide the power for heavy-duty tramp iron removal and cobbing applications. A highly oriented, barium ferrite ceramic magnet material provides pully performance, equal to



the most powerful electromagnetic types, at a much lower cost. The pulleys do not require expensive

EXECUTIVE REPORT #1

THEY SCRAPPED TRADITION

...to cut cleaning costs in half

Everyone from top management to the cleaning room foreman at Wahkonsa Foundry Co. endorses the change from barrel type tumbling mills to Wheelabrator airless blast cleaning of their gray iron and semi-steel castings. "We seldom get enthused or excited over any change in our production methods", says F. W. Dennis, foundry manager, "but the Super Tumblast has proven to be the ultimate in cleaning methods for our needs." His judgment in selecting the Wheelabrator has been confirmed by doubling their production rate, improving the cleaning quality, and cutting labor and operating costs squarely in half

See how Wheelabrator Engineering can Improve Your Blast Cleaning Operation

The chances are you, too, could benefit by modernizing your blast cleaning with Wheelabrator equipment and engineering. Call your nearest Wheelabrator office or write to Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.

coils, rectifiers, and switches necessary for the operation of electro pulleys. Pulley sizes range from 12 to 48 in. in diameter. (Stearns Magnetic Products)

For more data circle No. 42 on postcard, p. 107

Press Strain Indicator

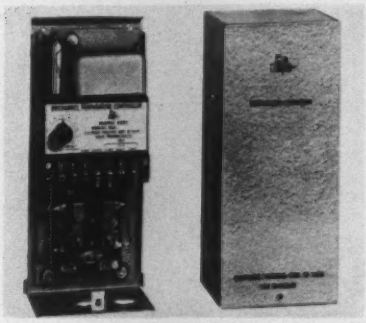
Visible and mechanical measurement of press strain is possible through the use of a 7 x 5 x 2-in.

device. The unit is welded or bolted to the press frame. Since all press loads translate into microscopic dimensional changes in the press frame, a mechanical amplification system within the device magnifies these strains and converts them to rotary motion. This rotary motion operates a dial indicator calibrated in percent of rated load. (Lebow Associates, Inc.)

For more data circle No. 43 on postcard, p. 107

Temperature Controller

A unichannel temperature controller provides close control and operation under conditions of shock and vibration. The controller comes with a load relay rated at 25 amps, 230v and a control stability to

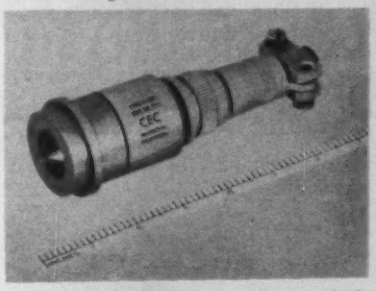


±1°F. Temperature ranges of 200-600°F and 0-200°F are available. (Electronic Processes Corp.)

For more data circle No. 44 on postcard, p. 107

Pressure Transducer

A new type of flush-mounted strain gage pressure transducer measures pressures from 0-100 to



5000 psi. The units maintain their accuracy under rugged environmental conditions, such as in high-pressure pneumatic systems and nuclear reactors. (Consolidated Electrodynamics, Corp.)

For more data circle No. 45 on postcard, p. 107

Earth Filter

A completely automatic diatomaceous earth filter filters aluminum rolling mill coolants. The filter is designed to eliminate oxidation contamination and other foreign matter which the coolant picks up during the rolling of steel and aluminum.

EXECUTIVE REPORT #5

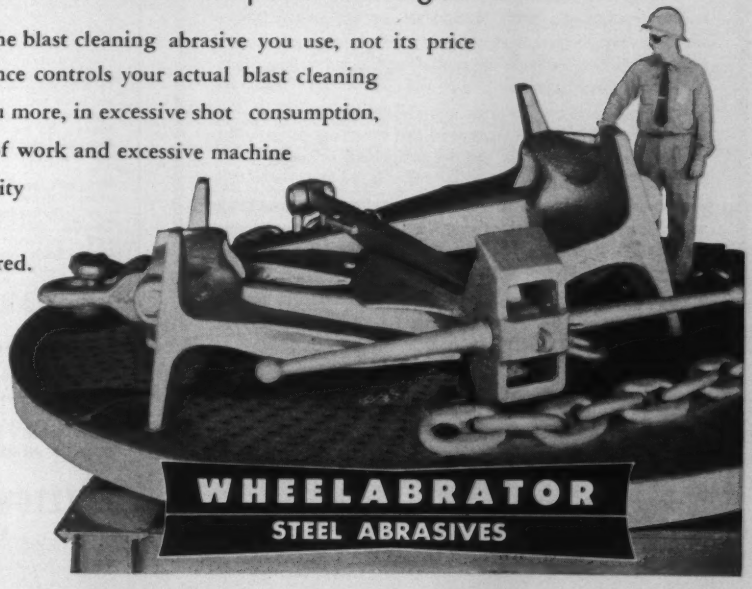
DON'T SAVE PENNIES TO LOSE DOLLARS

the lowest-priced abrasive can be an expensive bargain

Your real concern is the *ultimate cost* of the blast cleaning abrasive you use, not its price per ton. Abrasive quality and performance controls your actual blast cleaning costs. Lower priced abrasives can cost you more, in excessive shot consumption, lower production volume, poor quality of work and excessive machine maintenance. In case after case, high quality Wheelabrator Steel Shot has proven to be the *lowest-cost* abrasive, all factors considered.

You can prove the savings you'll make with Wheelabrator Steel Shot

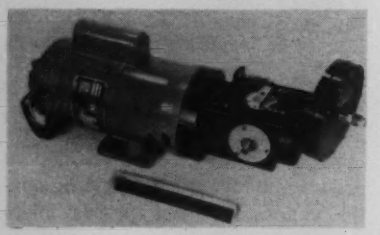
Your Wheelabrator Abrasive Engineer will demonstrate the performance of Wheelabrator Steel Shot in your own plant. For details write to Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ontario.



Because of the clarity of the effluent, use of the filter prevents stains on aluminum. (Dravo Corp.)

For more data circle No. 46 on postcard, p. 107

Pneumatic Control

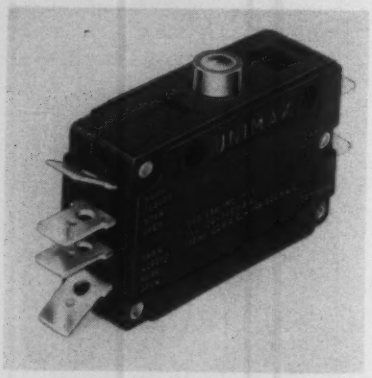


Fitted with a diaphragm for vacuum or pressure control, a variable-speed drive provides conversion from pneumatic to mechanical systems. A small amount of in.-oz pressure on the control shaft to change speed is all that is required for pneumatic control. Speed Control is accomplished with a pressure range of about 0 to 10 in. of water. The drive is available from the 1/1000 to 1/100 hp range, up to 1/10 hp. (Humphrey Products Div., Humphrey Inc.)

For more data circle No. 47 on postcard, p. 107

Snap-Acting Switch

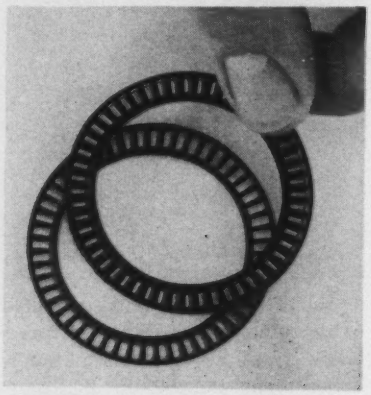
With two basic Type A snap-acting mechanisms contained in a single housing and actuated by the same operating button, a new precision switch provides a compact, flexible low-cost means for controlling electric circuits in automatic devices. Besides the basic pin-actuated model, the unit can be furnished with leaf, roller-leaf, hinged, and over-travel-plunger actuators. (Unimax Switch Div., The W. L. Maxson Corp.)



For more data circle No. 48 on postcard, p. 107

Thrust Bearings

One of the newest uses for glass-filled nylon is in cages for thrust bearings. They are available for either roller or ball bearings in a wide range of sizes. Most important, among many advantages of using glass-filled nylon, is that tramp metal invading the bearing



HOW LONG SINCE YOU CHECKED ON PERFORATIONS?

No matter what material your product demands Mundt can supply the exact perforation you need. Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics, and paper are punched as required for every functional and ornamental need.

You can count on Mundt's guarantee that sheets are perfectly flat, straight, parallel on the sides, and free from buckle or camber.

Our modern tool and machine shop is constantly making new dies to add to the tremendous variety of screens available. If you have a special problem we'll gladly supply design and metallurgical assistance.

No job is too small for our careful, personal attention . . . or too large for prompt delivery. Mundt's 90 years' experience is at your disposal.

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53 FAIRMOUNT AVENUE, JERSEY CITY 4, N. J.

PERFORATING SPECIALISTS FOR ALL TYPES OF MATERIALS

KUTZTOWN *Skill*

and NICKEL IRON CASTINGS

Although we do not mint nickels, we cast Nickel Iron Castings every day. As we all know, Nickel adds corrosion resistance and wear properties to cast iron.

In our 90 years history, we have supplied kettles, agitators, bearings, and many other Nickel-alloyed Iron castings for the chemical industry.

Kutztown cast Nickel Iron, Nickel - Chromium Iron, Nickel-Moly Iron, Ductile Iron, Ni-Resist, and Ni-Resist Ductile irons. Each type is chosen for its particular properties and is the answer to a specific problem. Whatever your need in alloyed gray iron may be, Kutztown is prepared to serve you. May we have your inquiry?

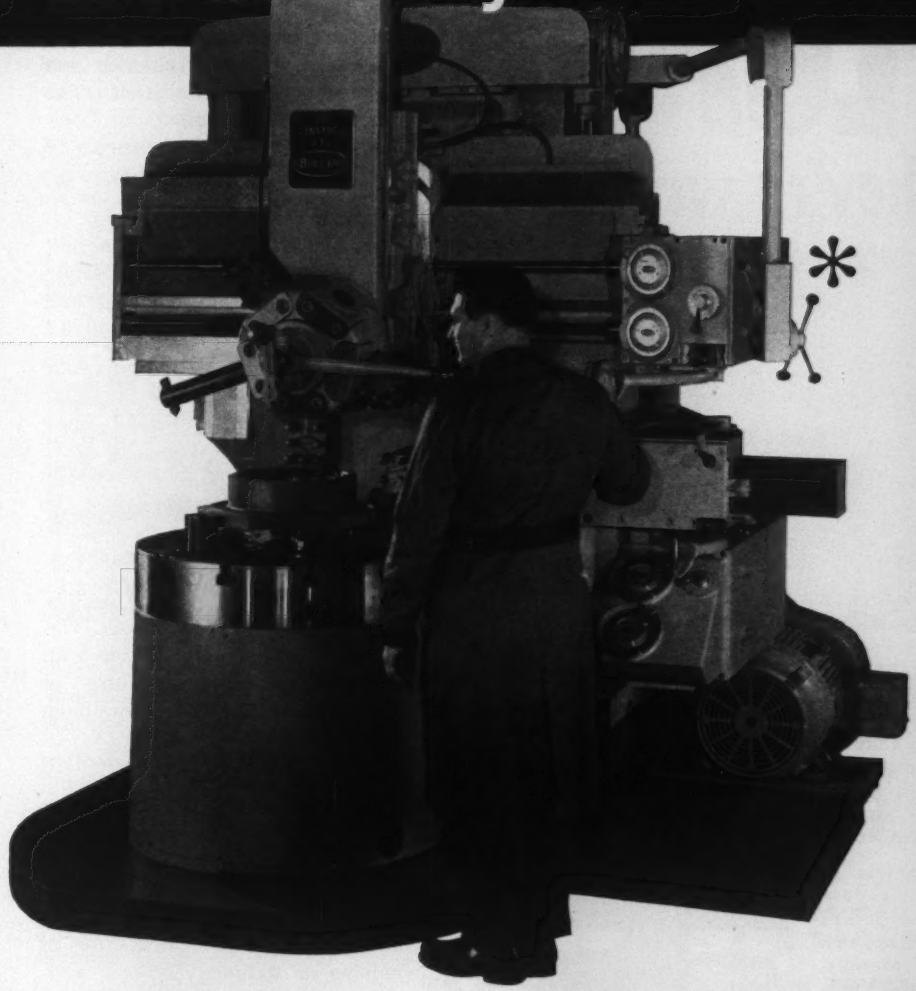
We'll be happy to place your name on our mailing list to receive regular issues of the "Kutztown REVIEW".

GRAY IRON • PRESSURE IRON • HIGH TENSILE IRON • LO-ALLOY IRON • NI-RESIST • NI-RESIST DUCTILE IRON • DUCTILE IRON

KUTZTOWN FOUNDRY & MACHINE CORP.

KUTZTOWN 33, PENNSYLVANIA

NOW FIRST Bullard DYNATROL* fully Power-Controlled V.T.L.



Dynatrol* V.T.L. has Bullard's new Dynamic Precision Control . . . a fully powered machine tool control system which pays off in greater production.

Dynamic Precision Control keeps the tool in the cut more of the time . . . cuts time between cuts . . . increases the operating speed and output of the machine.

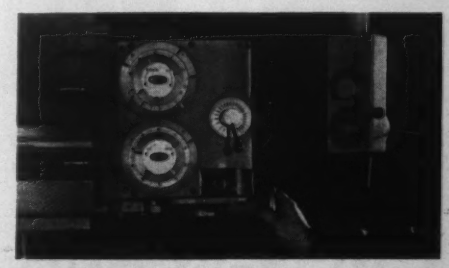
Dynatrol provides **infinitely variable feed rates** throughout the full range and **variable traverse rates** from zero to nine feet per minute. Feed rates may be advanced or retarded while the machine is cutting to obtain maximum tool performance and productivity.

Nine sizes from 26" to 124" table diameter.

Send to The Bullard Company, Bridgeport 9, Connecticut, for detailed catalog. Telephone EDison 6-2511.

*Trademark

The control center of the New Bullard Dynatrol V.T.L. provides single lever control for all motions of each head. Feed rates — infinitely variable from zero to maximum — are directly geared to table rpm. A simple pendant controls start, stop and speed of table. Equally simple remote controls are available for machines of all sizes.



High-Spot Features of the DYNATROL® V.T.L.

Dynatrol V.T.L. is POWER CONTROLLED

By lever or pendant — it's your choice — head traverse rates can be varied from zero to nine feet per minute. Easy-to-read dials show exact position.

Feed selector gives infinitely variable feed rate without interrupting the cut.

Dynatrol V.T.L. is VERSATILE

Available equipment includes:

Bullard variable speed drive for infinitely variable table speeds throughout the full range with no loss of usable horsepower.

Fully automatic operation by Bullard Man-Au-Trol or point-to-point or continuous path numerical control systems.

Unique Size-Au-Trol* for accurate positioning of all heads. Contouring attachments: Hydraulic, electronic or electro-hydraulic. Four- or five-sided power-indexing turret heads. Thread cutting, drum scoring and angle turning attachment. Power-operated chucks.

Dynatrol V.T.L. is COMPACT

The new Bullard Dynatrol V.T.L. is compact in design, rigid in construction, lower in height, reduced in floor area.

Dynatrol V.T.L. is EASY TO MAINTAIN

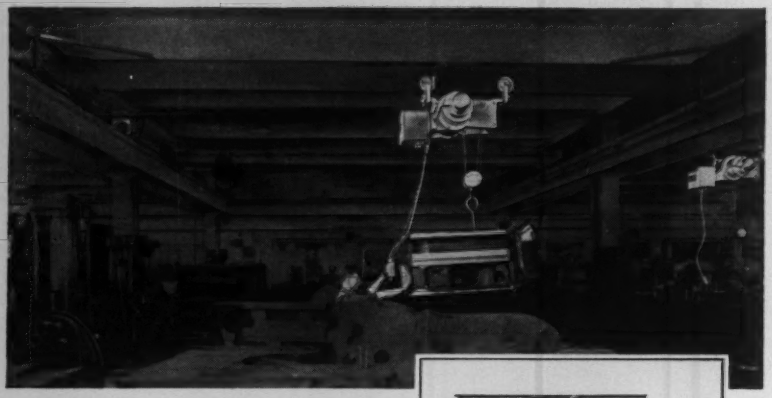
Automatic lubrication throughout... fewer parts... fewer adjustments... easily accessible.

BULLARD "YOU CAN'T BEAT A BULLARD"

SHEPARD NILES HOISTS

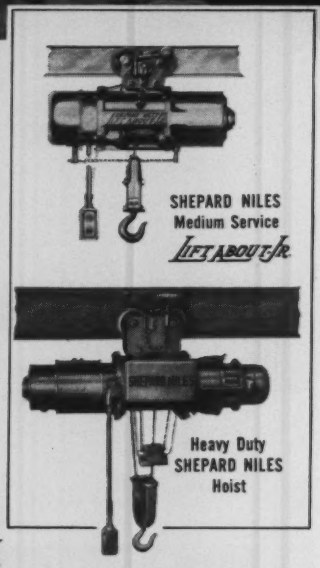
LIFT LOADS

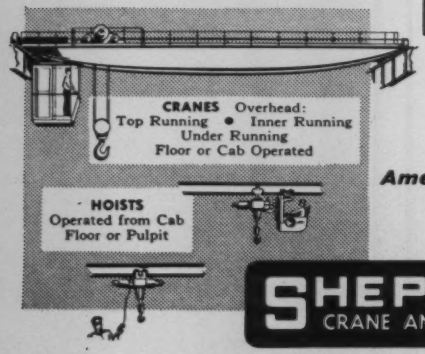
long after they're written off



LOOK FOR YEARS of dependable, trouble-free lifting when you invest in a Shepard Niles Hoist. Because Shepard Niles builds hoists that go on lifting long after you've written their original cost off. This is the kind of performance you expect and get with a Shepard Niles Hoist.

Investigate the complete line of Shepard Niles Hoists . . . choose from medium and heavy capacities with slow, medium or fast speeds. Built for cycle duty, heavy intermittent duty, medium duty and light-occasional service. Short to long lifts, standard or close headroom, manual or magnetic controls.





• Write for latest Bulletin showing Shepard Niles Hoists . . . and request our representative to call.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

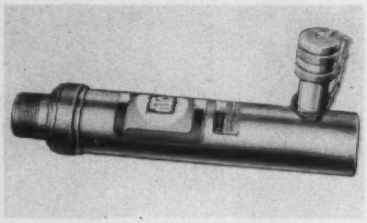
1483 Schuyler Ave., Montour Falls, N. Y.

area imbeds itself in the plastic. It results in reduced bearing abrasion and wear of adjoining metal surfaces. Other advantages are reduction in assembly time and initial material cost savings. The material has excellent wear resistance and requires no lubrication itself. (The Garlock Packing Co.)

For more data circle No. 49 on postcard, p. 107

Hydraulic Rams

Available in nine sizes, a new line of single-cylinder, single-acting hydraulic rams are compact and lightweight. Sizes run from 1 11/16

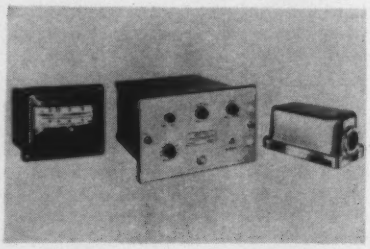


in. long with ⅝-in. stroke to 20¼ in. long with 13½-in. stroke. Capacities are from 2 to 50 tons with maximum working pressures of 8650 and 10,000 psi. (Owatonna Tool Co.)

For more data circle No. 50 on postcard, p. 107

Radiation Thermometer

Using advanced methods of infrared detection, a new radiation thermometer automatically measures and controls the temperature of moving or stationary objects with-



out physical contact. Sensitivity is high: 7° at 2000°F. The infrared sensing element is hermetically sealed within an optical head—a sturdy, dust-tight 9½ in. casting which is undisturbed by in-plant vibration and shock. The unit is

unaffected by ambient, or room, temperatures from 20° to 120°F. (Radiation Electronics Co.)
For more data circle No. 51 on postcard, p. 107

Condensate Trap

An all-electrical condensate trap provides maintenance-free operation. It's designed for compressed air and steam system use. A single electrical condensate trap controls up to four solenoid valves in various condensate lines. (Evirso, Inc.)
For more data circle No. 52 on postcard, p. 107

NEW FILMS

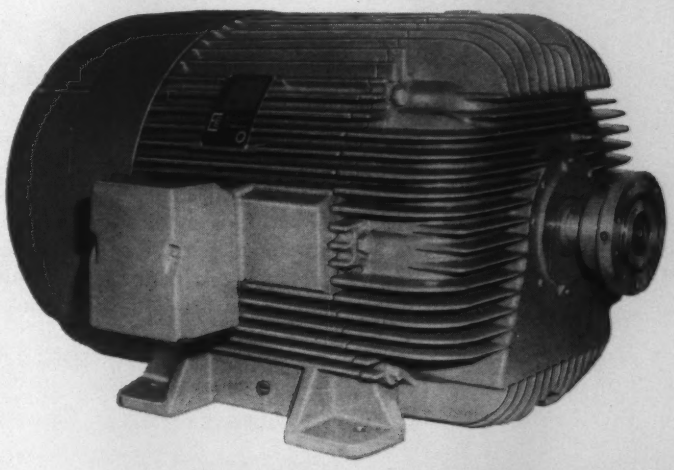
"Arbitration in Action" is based upon an authentic labor-management grievance, heard and decided under the rules of the American Arbitration Association. A complete record of each step of hearing room procedure, the film includes administration of the arbitrator's oath, examination and cross-section of witnesses, presentation of evidence, summary arguments, and the arbitrator's analysis. 58 minutes, 16-mm, sound. Education Department, American Arbitration Assn., 477 Madison Ave., N. Y. 22.

"Arc Welding Electrode Selection" outlines a step by step procedure covering base metal identification, welding currents, welding positions, thickness and shape of base metal to be welded, joint design and fit up, service conditions, production efficiency, environmental and job conditions. 25 min. 16-mm color. Hobart Bros. Co., Troy, Ohio.

"Miracle Bridge Over Mackinac" presents the building of the 5-mile-long Mackinac Bridge which joins Michigan's upper and lower peninsulas. The film includes scenes of construction crews racing against time to complete the 34-pier substructure before winter jams the Straits of Mackinac. 28½ min. 16-mm color, sound. Association Films, Inc., 561 Hillgrove Ave., La Grange, Ill.

ELLIOTT C-W SEALEDPOWER MOTORS

This new 300-hp unit is the largest of the Elliott C-W "family" of ribbed-frame enclosed motors, pioneered in the United States by Crocker-Wheeler.



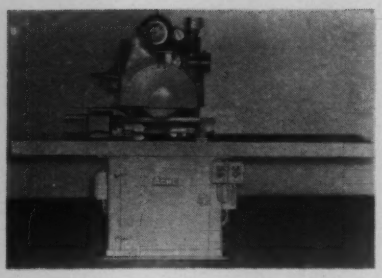
BEST FOR YOUR TOUGHEST JOBS BECAUSE THEY ARE BETTER COOLED BETTER PROTECTED BETTER BUILT

IMPORTANT FACTS are given in new Elliott Bulletin PB 6000-2. Send for free copy now.

ELLIOTT Company
Crocker-Wheeler Plant • Jeannette, Pa.

WB-5

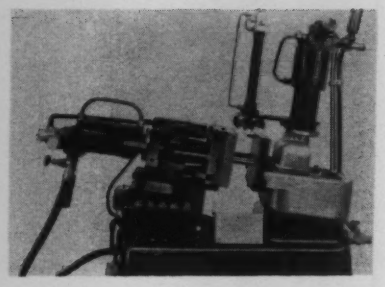
New Equipment and Machinery



Machine Polishes and Buffs Tubular Shapes

Round, square, hexagonal, or octagonal tubular metal parts are finished on an automatic polishing and buffing machine. The machine also performs automatic deburring operations. Desired type of finishing or deburring is performed by buffing wheels, abrasive belts, set-up wheels, or wire brushes. The machine is comprised of a motorized head, reciprocating work table, and a cam-operated index mechanism for a group of mandrel assemblies mounted on the table. Parts up to 42-in. are handled. (Acme Mfg. Co.)

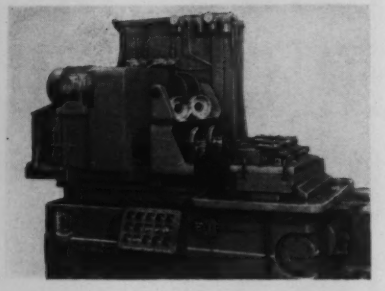
For more data circle No. 53 on postcard, p. 107



Machine Employs Two New Safety Features

A push-button controlled, single-cycle, automatic die-casting machine has a four-way adjustable die unit and spacer plate. Single-cycle automatic operation is accomplished through the use of an electronic timer unit, which features speedy attachment. Two new safety features employed in the machine are: dual micro-switches replacing the die overlock safety, and a sensing device which retracts the toggles immediately, if foreign matter enters between the die faces. (DCMT Sales Corp., Div. of British Industries Corp.)

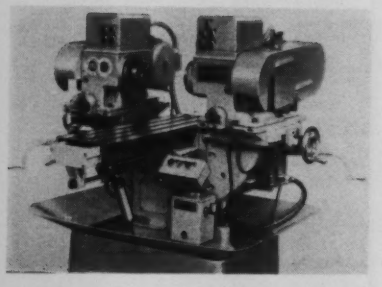
For more data circle No. 54 on postcard, p. 107



Contouring Machine Designed for Many Operations

An air-operated, cam contouring machine is designed for production boring, turning, contouring, and facing operations. Operations may be performed singly, or in combination of sequences. All machine functions are electrically interlocked. The air power supply is 80-120 psi. The machine has a 4-in. cam-controlled stroke on the main slide and cross slide. The cross-slide is double-keyed to the base, in both directions, for accuracy. By raising the cross-slide, the cams can be quickly changed. (Machinery Div., Olofsson Corp.)

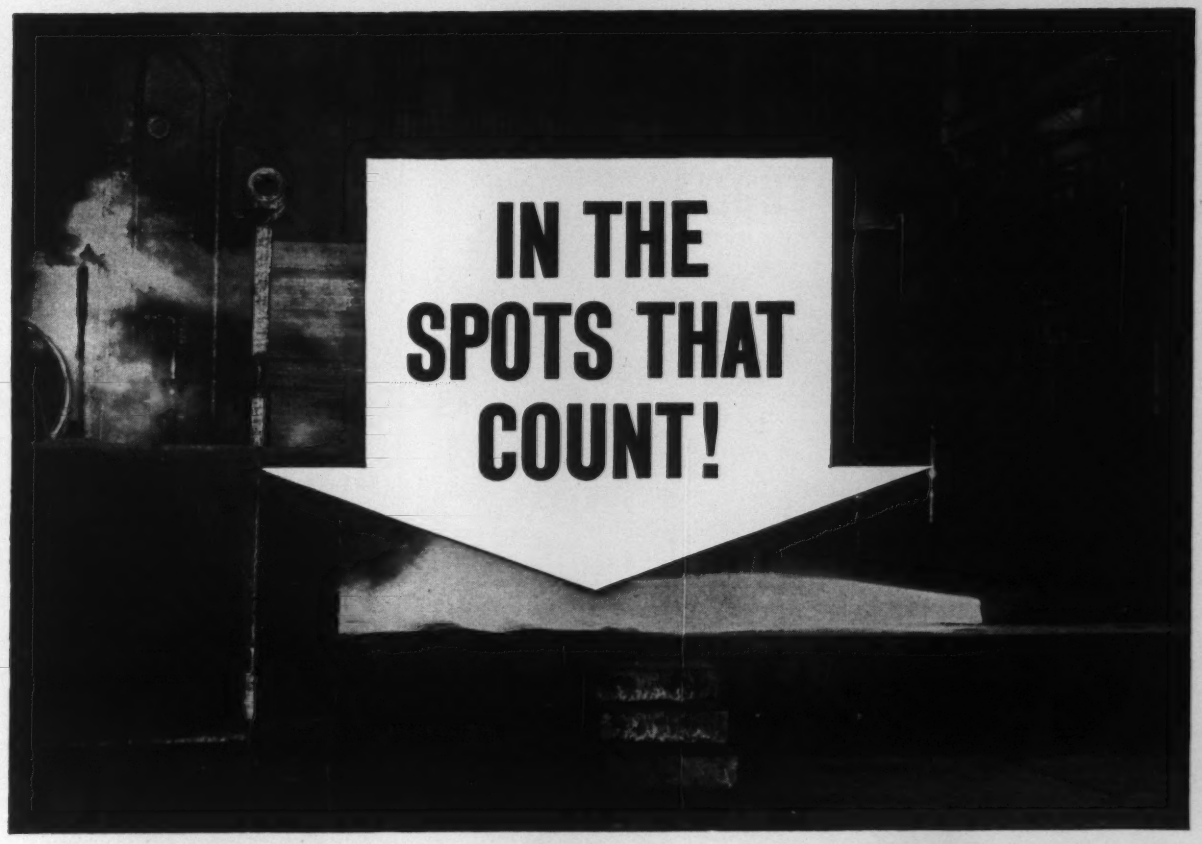
For more data circle No. 55 on postcard, p. 107



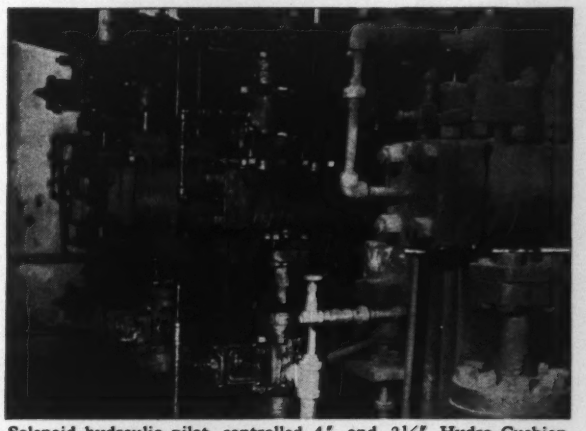
Twin Mill Features Increased Capacity and Power

Provided with 2-hp motors for both milling heads, and a wide, heavy 36-in. table, the duplex miller can handle heavy cuts over the 20-in. table feed range. In the event of a power failure, the miller automatically returns all power feeds to their starting positions. Other features of the mill include an independent six-way adjustment for both milling heads, automatic cutter retraction on table return stroke, double table cycling provision, and automatic lubrication of table ways. (REM Sales, Inc.)

For more data circle No. 56 on postcard, p. 107



split-second control with Homestead® Operating Valves keeps steel plate rolling!



Solenoid-hydraulic pilot controlled 4" and 2½" Hydro-Cushion Homestead Operating Valves; and Lever-Seald Hydraulic Stop Valves; 800 pounds working pressure.

Six days a week, twenty-four hours a day, 250 times an hour, the tilt tables and middle roll of an East Coast Plate Mill are exactly positioned without shock, and held without creepage, by Homestead Operating Valves. This precision control has permitted record-breaking rolling of the hot steel slabs into plate.

Through more than *three and one-half million* split-second rollings during the two years the 2½" and 4" Hydro-Cushion Homestead Operating Valves have been in service, not one shutdown has been required for valve maintenance! Performance records such as these, are assured by the protected seat and cushioning action of the Homestead Valves.

For any hydraulic control problem, there is a Homestead Operating Valve to meet your needs. Send today for Reference Book 39-6.

Please send Reference Book 39-6 and prices on all types of Homestead Operating Valves. 23

Name.....Title.....

Company.....

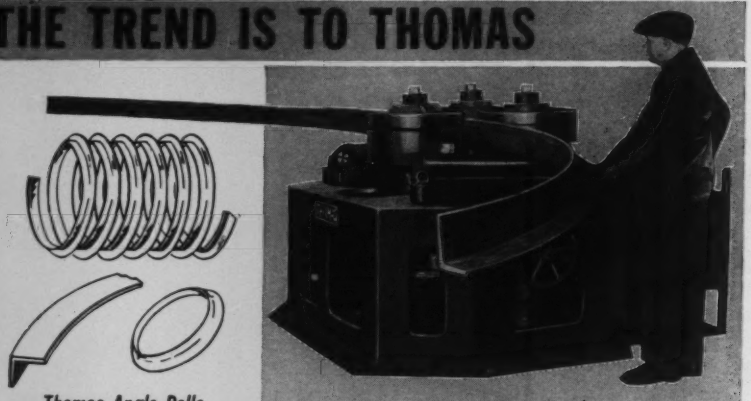
Address.....

City.....Zone.....State.....

hv

HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 23, Coraopolis, Pennsylvania

FOR SEGMENT OR CIRCLE BENDING OF ANGLES
THE TREND IS TO THOMAS



Thomas Angle Rolls will handle angles up to 6 x 6 x 7/8"

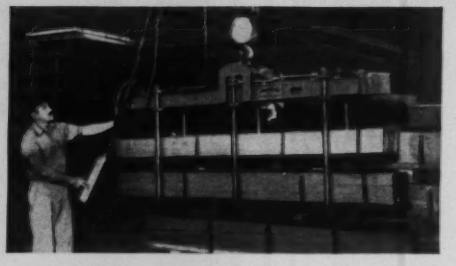
Thomas Angle Benders are of all steel construction and come in two styles and four sizes. Standard rolls permit "leg in" and "leg out" bending of angles. The machines may be converted for bending flats, rounds, squares, beams, channels, pipe and other shapes.

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

Write for Bulletin 314-A

65

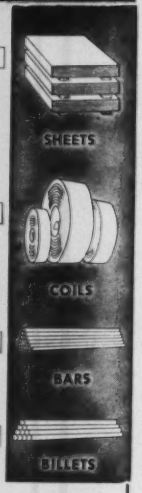
MANSAVER® GRABS
Handle Millions of Tons in Your Industry



$25,000 and 2,800 Square Feet of SPACE SAVED with a MANSAVER SHEET GRAB!

A large business machine manufacturer states that without the Mansaver they purchased, "we would have needed at least 2,300 to 2,800 **additional** square feet of floor space." This plant figures space at $10.00 per square foot; the space conserved by the Mansaver meant a dollar savings of approximately $25,000.00. The grab cost only $1,235.00.

Ask our District Representative into your plant to study your handling problem for presentation for our solution.



CHECK ITEMS YOU HANDLE AND SEND FOR LITERATURE AND MORE INFORMATION

MANSAVER INDUSTRIES, INC.
3106 East St., New Haven, Conn.
Also Manufactured in England and in France

NEW EQUIPMENT

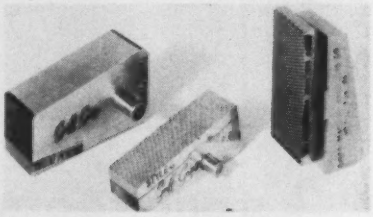
Welding Rod

Capable of joining 14 different metals, a nickel-silver gas welding rod can be applied in all positions without fuming or overheating the base metals. Available in 36-in. lengths in 1/16, 3/32-, ⅛-, 3/16-, and ¼-in. diameters, they are packaged in 10-lb boxes. (Air Reduction Sales Co.)

For more data circle No. 57 on postcard, p. 107

Grip Blocks

A new type of grip, featuring a replaceable insert, eliminates the replacing of expensive grips when worn out. Used on physical pull testing machines, the grips come in a set of four, fitting into holders attached to two opposing rams on a



pull test machine. Made of high shock resisting tool steel, the grip has a 100 pct gripping surface. They are available in three sizes—for 8000-lb, 10,000-lb, or 20,000-lb holders. (Griff Machine Products Co.)

For more data circle No. 58 on postcard, p. 107

Air Gun Cleaning

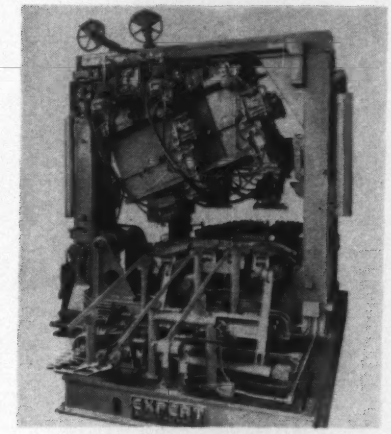
Weighing only 3.3 lb, an air gun cleans, de-rusts and de-scales. Only one hand is required to operate the recoiless air gun, allowing the operator's other hand to perform minor tasks in the immediate area of operation. (Swissair Tool Corp.)

For more data circle No. 59 on postcard, p. 107

Tracer Welding System

A tracer welding system permits continuous joining of metal parts with untrimmed, straight line or contour weld edges. By means of contour cams, built into the machine, the basic welding head car-

riage follows design contour. A mechanical probe, connected to the tracer system, follows the actual weld contour. The "error" between design and actual contours is translated to a memory unit. This infor-

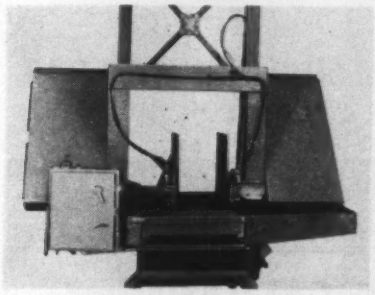


mation is transmitted to the welding torch which is correctly positioned on the actual weld line of the part. (Expert Div., Expert Die & Tool Co., Inc.)

For more data circle No. 60 on postcard, p. 107

Horizontal Band Saw

Cutting a 21 in. round aluminum billet in 10 minutes is easy work for a new horizontal band saw. The machine is 107 in. high, 101 in. side to side, and 60 in. front to

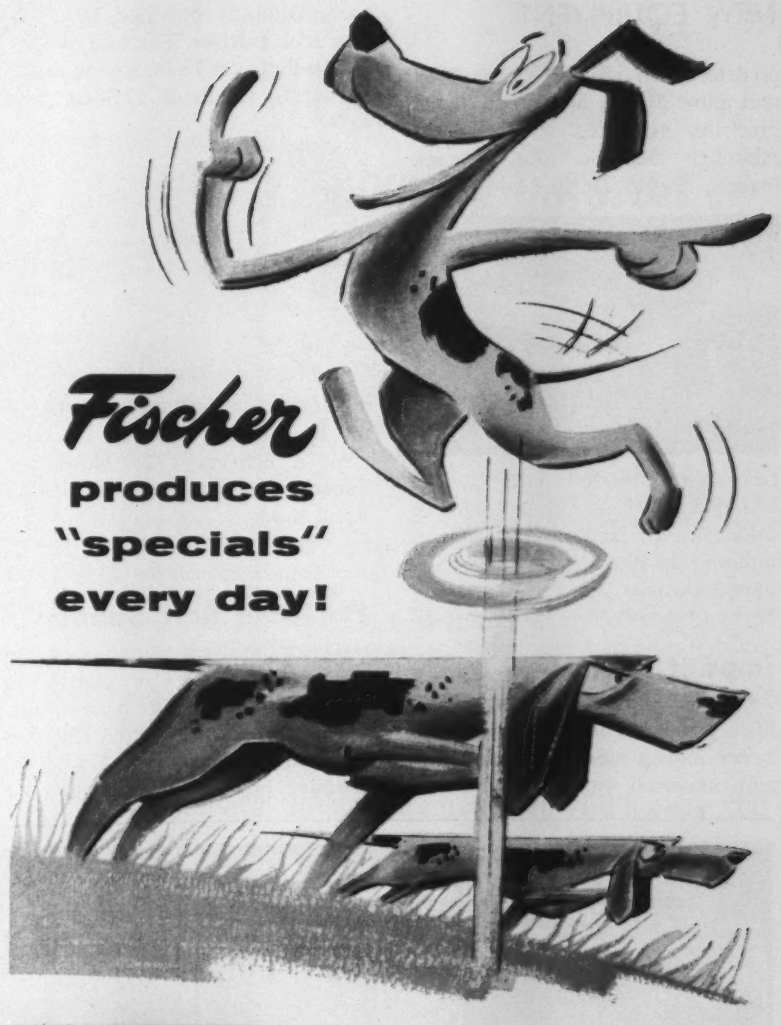


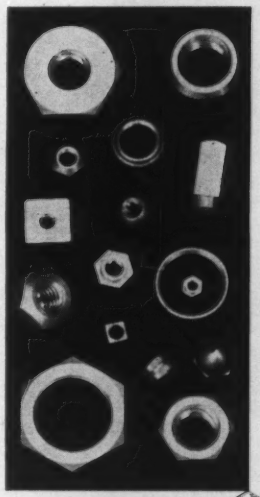
back. It features a variable speed drive from 45 to 1200 fpm with a 5 hp drive motor. Cutting capacity is 24 in. wide x 36 in. high. (W. F. Wells & Sons, Inc.)

For more data circle No. 61 on postcard, p. 107

Automatic Mill

Automation techniques are applied to high speed production milling of small parts in large quantities by an automatic mill. Employing a powerful chain drive,





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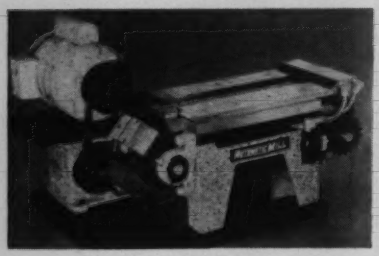
predetermined speeds are acquired that allow 500 to 6000 parts to be precision machined in one hour. Although the new unit is hand loaded, hopper feeding for quanti-

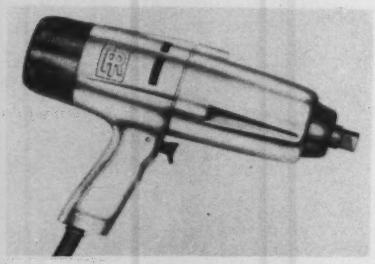


ties above 500,000 parts can be installed. Because close machine tolerances are held, a wide range of milling operations is possible. (Sieburg Industries, Inc.)

For more data circle No. 62 on postcard, p. 107

Impact Tool

A heavy-duty impact tool obtains high power through the use of a heavy impact mechanism and a 6-amp universal motor. Good power transmission is provided by a T-type socket driver. The tool, weighing 10-lb, has a ⅝-in. square drive, an overall length of 11⅞-in., and

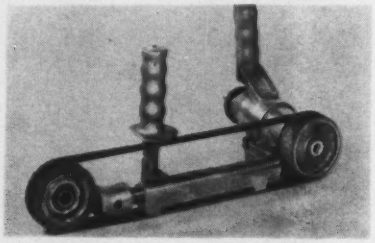


a side to center distance of 1-11/16 in. Having a free speed of 1700 rpm, it delivers 1725 blows per minute when impacting. (Ingersoll-Rand Co.)

For more data circle No. 63 on postcard, p. 107

Portable Belt Sander

Operations requiring slack of belt, contact wheel or platen can be accomplished with a new portable abrasive belt unit. The air-powered unit employs a 1 x 36 in. abrasive belt and an air motor—approximately 1 hp at 6000 rpm. The belt speed is 4500 sfpm. Hand held or bench mounted, it is designed for heavy stock removal, polishing, and blending; the sander



can be used on all materials including ferrous and non-ferrous metals, fibre glass, and plastic. (Nu-Matic Grinders, Inc.)

For more data circle No. 64 on postcard, p. 107

Storage-Feeder Unit

A storage-feeder unit, with up to 12,000 parts capacity, is used for automated parts handling systems. With an adjustable feed rate up to 6000 parts per hour, the unit can accommodate several different parts

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*Trademark

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makes boring bars for ANY size machining job

Machining large gun tubes has been a problem for years. At the Watervliet Arsenal, the 40-inch powder chamber in 120mm M58 type tubes presented an extremely difficult job due to the length-to-diameter ratio of 12:1. After steel boring bars proved unsuccessful, costly high-speed contour reamers were used but required 9.2 hours to semifinish the chamber for grinding. In addition, maintenance of the reamers cost $121 per unit.

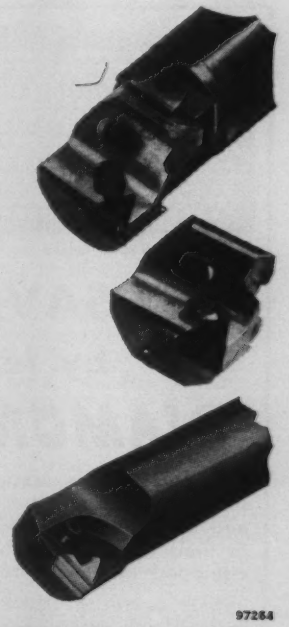
With the Kennametal bar shown at left, machining time has been reduced to four hours. Due to its high Y.M.E. (3:1 ratio over steel) deflection and vibration were practically eliminated. Extreme accuracy and consistently fine surface finish is provided despite the 43.5-inch overhang, and a .200-inch depth of cut. After fully repaying its original cost, the Kennametal bar saves $10,700 per 100 pieces over the reaming method.

Kennametal Boring Bars can save YOU money, too

On small or medium size boring jobs, new adjustable-head Kennametal K-Bars (right) provide the same accuracy and fine finish due to their high resistance to deflection and chatter. Standard K-Bars are available in seven diameters from 1 to 2½ inches—with two or three adjustable heads—for high precision work. This design brings simple, accurate adjustment . . . without sacrificing strength and rigidity.

Standard Kendex Boring Bars (lower right) are stocked in seven diameters. Made from heat treated alloy steel, these bars are ideal for less severe applications. They are fitted with standard Kendex triangular or square inserts, with solid Kennametal chipbreakers and shims for positive seating.

Get more information on Kennametal Boring Bars . . . for ANY size machining job. Call your Kennametal Representative, or write . . . KENNAMETAL INC., Latrobe, Pa.



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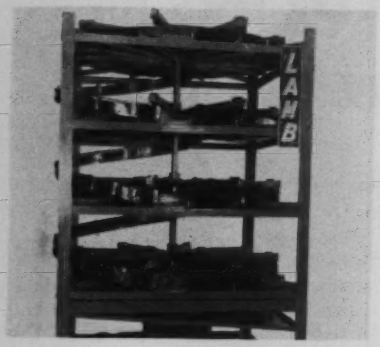
simultaneously. The feeder maintains in-storage part orientation, and first-in-first-out part sequence. Each storage deck is a spiral track.

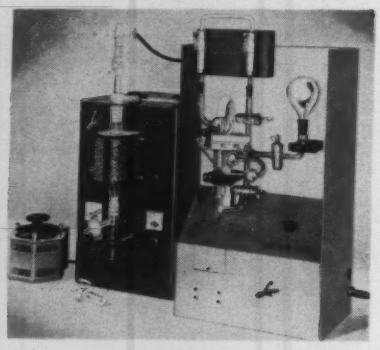


The units are available with from one to six decks, in sizes from 40- to 72-in. deck diameter. (F. Jos. Lamb Co.)

For more data circle No. 65 on postcard, p. 107

Hydrogen Analyzer

A compact hydrogen analyzer combines speed and accuracy with simplicity of operation. Using a hot extraction principle, the hydrogen analyzer meets ASTM requirements. Outgassing of a crucible is eliminated through the use of a patented, inert, blank-free susceptor. A unique device allows one sample to be loaded or removed from the system without breaking the vacuum. (Laboratory Equipment Corp.)



For more data circle No. 66 on postcard, p. 107

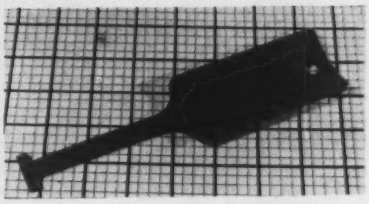
Multi-Purpose Oil

Featuring good extreme pressure qualities, penetration, compatibility with ordinary lubricants and long-life in general purpose applications, a medium heavy diester oil has an over-all temperature range of 40° to 350°F. Having a low evaporation rate, and a viscosity index of 174, the multi-purpose oil also exhibits good resistance to sling off, drip off and wipe off. Oxidational stability is excellent. (Lehigh Chemical Co.)

For more data circle No. 67 on postcard, p. 107

Tool Cleans T-Slots

Available in two sizes, a machine tool cleaner removes chips from planer or machine tool table slots. The handle section has a scoop design for removing machine chips



from the pocket end of the machine tool table. One of these tools on each machine is a real time and labor saver. (Dayton Rodgers Mfg. Co.)

For more data circle No. 68 on postcard, p. 107

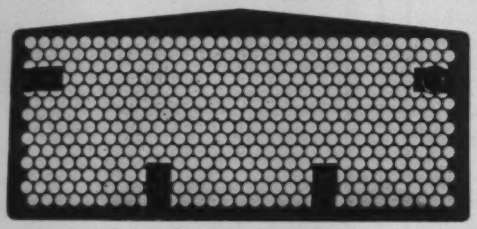
Smokestack Liner

Steel smokestacks, lined inside and out with a colored acid-resistant glass, gain prolonged life. Colored dyes are permanently fused right into the stack's glassed exterior, thereby contributing aesthetic qualities. Painting maintenance is eliminated because extreme temperature and weather conditions have little or no dulling effect on the colored glass. (A. O. Smith Corp.)

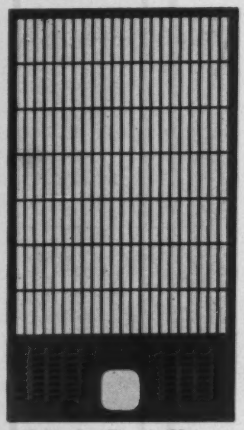
For more data circle No. 69 on postcard, p. 107

Aluminum Rolling Oil

An improved aluminum rolling oil, it's claimed, has greater prime yield and lowers cost per ton. It results in better mill run quality and annealing. The material requires no other additives or chemical compounds. Mill-operation checks show that there is no appreciable loss in plant filtration systems. This high recovery rate results in lower over-



Rodent Guard for Electric Motor



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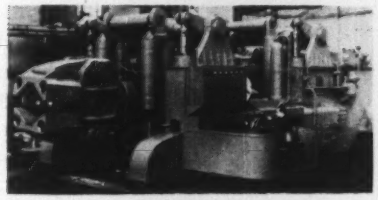
all cost and more uniform and stable rolling oil performance. (L. R. Kerns Co.)

For more data circle No. 70 on postcard, p. 107

Forging Manipulator

Designed for heavy, rugged operating conditions of hammer or press forging, the hydraulic forging manipulator is track mounted. Operating on a closed water-hydraulic

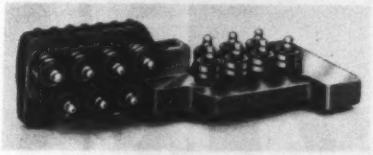


system, it derives power from machine mounted accumulators. The machine's capacities range from 3 to 110 tons, determined by the maximum weight of hot stock manipulated. (Salem-Brosius, Inc.)

For more data circle No. 71 on postcard, p. 107

Wire Straighteners

Wire straighteners, featuring adjustable rolls and needle bearings, straighten flat, round, or irregular cross-section wire. The rolls can be grooved to exact wire diameter, or



v-grooved to handle a wide range of sizes. Available in five standard and two heavy-duty models, the straighteners are designed for use with automatic feeds. (Durant Tool Co. of Providence)

For more data circle No. 72 on postcard, p. 107

Wire Skinner

A small lightweight skinner removes sheath metal in a manner similar to a pencil sharpener. Used for thermocouple wire, the wire is inserted into the tool and then rotated in a clockwise direction. The metal sheathing is cut away cleanly. Three sizes are available to accommodate 1/25-, 1/16-, and ⅛-in. diam wire. (Thermo Electric Co., Inc.)

For more data circle No. 73 on postcard, p. 107

NEW BOOKS

"Flow Properties of Bulk Solids," Bulletin No. 95 of the Utah Engineering Experiment Station, was written to aid design of bulk-solid storage systems. 51 pp. $1.50 per copy. University of Utah, Salt Lake City, U.

"Russian-English Glossary of Optics and Spectroscopy." Over 4000 terms, Russian to English only. 78 pp. $10 per copy. Interlanguage Dictionaries Publishing Corp., 227 W. 17th St., New York 11

"State Taxation of Interstate Commerce: P.L. 86-272 Reviewed" is an interpretation of the new law prohibiting a state from taxing an out-of-state corporation's net income derived exclusively from solicitation of orders. 44 pp. $1 per

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NEW BOOKS

copy. Machinery and Allied Products Institute, 1200 18th St., N. W., Washington 6.

"Foundry Engineering," by H. F. Taylor, M. C. Flemings, and J. Wulff, covers fundamental concepts applying to casting. Engineering principles and methods of foundry operation are covered in detail. John Wiley & Sons, Inc.

"Extractive Metallurgy," by Joseph Newton, provides total coverage of the field, concentrating on the basic principles involved. Intended primarily as a text, it also includes topics from physical metallurgy. 532 pp. $9.75 per copy. John Wiley & Sons, Inc.

"Forney Arc Welding Manual" is a comprehensive course in the fundamentals of metal repair by welding and soldering. Detailed information is provided on various uses of arc welders, carbon-arc torches, and soldering irons. 210 pp. $2.50 per copy. Forney Arc Welders, Inc., Box 563, Fort Collins, Colo.

"Recommended Equipment and Procedure for the Palletized Loading and Shipment of Refractory Products," a revised edition, has certain major changes. Pallet loads are increased in many cases to reduce number of pallets in shipment. 44 pp. $1.50 per copy. The Refractories Institute, First National Bank Building, Pittsburgh 22.

"A Visit With 500 Die-Cast Plants" is a very comprehensive book on diecasting. Over 100 authorities contributed. 600 pp. $10 per copy. The American Charcoal Co., 201 S. Green St., Detroit 17.

"Defense R & D Contracts Guide" provides all concerned with information and advice on how and where to obtain contracts from the military services on research and development, engineering, and test evaluations. 150 pp. $25 per copy. Vincent F. Callahan, Publisher, Evans Bldg., Washington 5.

"Guides for Business Analysis and Profit Evaluation" discusses various management tools employed in the analysis of accounting records. The booklet provides a comprehensive listing of financial studies available from government and business sources. The publication serves as a basic reference for all who analyze business operations of retail, wholesale, service trade organizations, and other businesses. Included, are operating and financial ratios developed from income and balance statements and the use of statistic's from the Census of Business and Internal Revenue Service. 76 pp. 30¢ per copy. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

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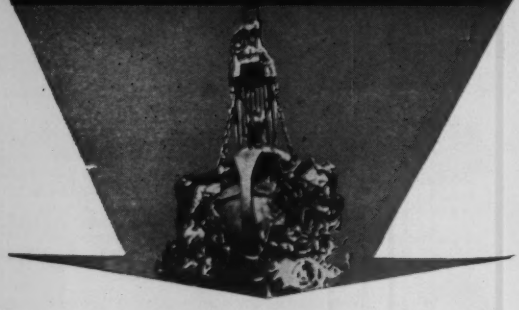

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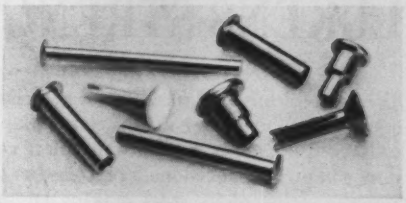

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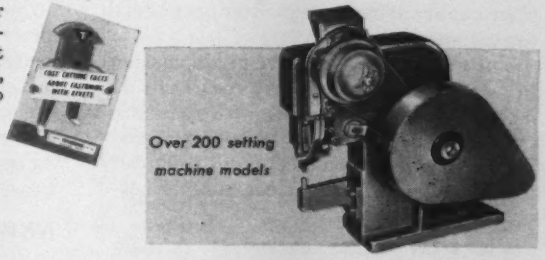

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Protecting product quality is the responsibility of Lukens' Metallurgical Division. Four members of this expanded control team are, left to right: Sam Lemmon, Metallurgical Service; Lou Mandich, Manager; Howard Turner, Inspection; and Joe Althouse, Chief Metallurgical Engineer.

LUKENS STRENGTHENS THE GUARD ON QUALITY

To the steel buyer, Lukens' new ranking as a steel plate producer means more than increased tonnage. It promises complete confidence in buying decisions. For, together with the expansion of its steel making facilities, Lukens has strengthened its control over plate quality at every step—from open hearth to customer's shop.

The men assembled above in Lukens' new Physical Testing Laboratory spearhead this increased control. Working with the industry's broadest range of plate materials—from ordinary carbon steel to ultrasonically tested hullplate for nuclear submarines—these experts represent the emphasis Lukens places on dependable plate quality.

Now consolidated into one closely working team are these vital functions: Inspection, Plant Metallurgy, Metallurgical Development, Quality Control and Metallurgical Service. Under Lou Mandich's direction, and together with Lukens' other operating and marketing groups, they are successfully pursuing the overall aim of our expansion program: *capacity and quality levels to meet the growing needs of our plate fabricating customers.*

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The Iron Age Summary

Steelmakers Up Capital Spending

Drive to keep costs in line in the face of higher wages is the big factor in new capital spending plans.

Trend to computer controls is apparent in new programs throughout the industry.

■ The steel industry's drive to lower production costs is pushing its capital spending plans to near-record levels.

Spending programs for 1960 are approaching the record of $1.75 billion set in 1955. This second major spending spree comes at a time when steelmaking capacity is considered adequate.

Behind the Trend—A significant part of the trend is the extension of computer controls to a wide range of steelmaking operations.

This means that the principal target of the programs will be to counteract climbing labor costs as well as to improve quality. The recent settlement is estimated to add 3.5 pct a year to steelmaking labor costs, compared with the annual rate of productivity gain of 2.5 pct.

No Secret Agreement—The trend of the improvement programs indicates that there was no "secret agreement" between the steel companies and the United Steelworkers that the union would give in quietly on controversial work practices in the historical 2-B contract clause.

Bitterness between the companies and the union following the settlement persists at the top levels. Any major gains in eliminating wasteful work practices are still in the wishful thinking stage.

Worker Attitude—Biggest ground for hope of worker cooperation is found in the attitudes of the production workers and rank-and-file union members. Attitude of the workers at the mill level has never been better. This may lead the way to improving efficiency in individual plants and companies.

The trend in capital spending is reflected in current announcements of new computer controls going into steel mills.

Computers Coming — At least nine major computer controls are going into mills. These include strip mills in the Detroit and Pittsburgh areas; plate mills in the Midwest and South; a sintering line in Ohio, an annealing line in Pittsburgh; and a utility system in an eastern mill.

On general market conditions, the market remains tight for most products and no real easing is in sight until well into the second quarter.

But the frantic quality has gone out of demand for pipe, stainless, some heavy steels on a regional basis, and warehouse steel except sheets. Sheets and other products used by the auto industry continue in strongest demand.

Inventory Buildup — Although there are conflicting reports from industry sources, investigation has not uncovered any evidence of extensive buildup of steel stocks among major users. It's estimated that probably 10 pct of steel shipments is going into inventory buildup.

The industry generally has a watchful eye on auto sales and production. To date, sales have not been up to expectations, although relatively good. Unless sales pick up, they could affect February and March production plans.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,707	2,707	2,689	2,293
Ingot Index				
(1947-1949=100)	168.4	168.4	167.4	142.8
Operating Rates				
Chicago	96.0	95.0	95.0	85.0
Pittsburgh	97.0	99.0*	96.5	76.5
Philadelphia	101.0	102.0	102.0	90.0
Valley	90.0	90.0*	96.0	78.0
West	89.0	86.0*	87.0	86.0
Cleveland	100.0	100.0	97.0	85.0
Detroit	74.0	86.0*	103.0	77.0
Buffalo	105.0	105.0	105.0	100.0
South Ohio River	99.0	98.0*	99.5	92.0
South	92.0	93.5	93.0	72.5
Upper Ohio River	95.0	94.5*	90.5	85.0
St. Louis	101.0	103.0*	87.0	83.0
Aggregate	95.0	95.0	95.0	81.0

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$42.17	$42.50	$41.50	$43.83
No. 2 bundles	$28.17	$28.50	$27.83	$30.33
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	30.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	100.50	100.375	99.375	101.00
Zinc, E. St. Louis	13.00	13.00	12.50	11.50

More Business in Maintenance

Industry is taking a greater interest in its maintenance problems.

It's a sure way to cut costs. And this is what industry is looking for more than ever.

▪ Maintenance is no longer a team of men making hasty repairs on leaky pipes or broken down machinery. It is now vital to industry in general, and big business for maintenance equipment makers.

Industry needs more efficient maintenance to cut costs. In the drive to achieve this, it is making greater demands than ever on maintenance equipment makers. Industry wants equipment that is durable, dependable and, in many cases, automatic.

Updated Equipment—And equipment makers are starting to meet industry's needs. At the Plant Maintenance and Engineering Show at Philadelphia last week, thousands of products were displayed. There were few really new items. Most manufacturers stressed updated equipment. Tools have been streamlined for greater speed and maneuverability. Industrial vacuums are more powerful. And almost all items will last longer.

Exhibitors report attendance at the show was better than at any previous maintenance exhibit. And interest in all product lines was high.

Why the Interest—Why is industry so conscious of maintenance? With labor costs rising so sharply, maintenance equipment makers say industry must look to other areas to make up the difference.

Time and money lost because of downtime can at times be overwhelming. This is one specific area where industry is looking to cut maintenance costs with higher quality equipment.

More Spending—Others say foreign competition is forcing many industries to hold fairly solid price lines. To do this they have to cut mounting production costs.

M. H. Reck, assistant sales manager, Jamesbury Corp., ball valve makers, says industry is now willing to spend more for maintenance. No longer is price the prime influence. It wants equipment that will last for long periods under heavy work loads.

Keener Competition — Also, he says, industry is clamoring for new and improved products. Competition is getting tougher, too, he says, and equipment makers are doing more and more research to come up with products to satisfy industry.

An Allis-Chalmers spokesman says his firm is constantly working to improve its line of maintenance equipment. Extra features are being added to standard equipment so one machine can do many jobs.

Outdoor Coverings—Outside plant maintenance is becoming more important to industry, too. Reynolds Metals Co. reports a fast growing interest in aluminum exteriors for plants. The metal exteriors cost less to keep up and act as good insulators against summer heat, the company says.

In addition to buying better equipment, industry is also training maintenance personnel. H. B. Walker, plant maintenance superintendent, Union Carbide Chemicals Co., says his firm uses classroom and on-the-job training to acquaint supervisory personnel with newest maintenance methods.

INSPECTION: A maintenance supervisor checks lubricant levels to see that machines' bearings are getting proper lubrication.

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Order Is Returning To Steel Market

Assured delivery of steel in the months ahead, some steel users are pausing for a reappraisal.

They're taking the water out of earlier orders. But demand remains strong and not everyone can get enough steel.

■ The steel market is showing signs of settling down. Users are assured of a continuous supply of steel. So many of them are pausing long enough to reappraise the situation.

Mills are closing the gap between promised delivery dates and the actual delivery. For many items, deliveries are now on schedule. For some of the tightest items, particularly flat-rolled products and bars, the delivery lag has been cut to less than two weeks.

Wringing Out—In any case, the flow of steel is fairly continuous. For this reason, some users are beginning to take some of the water out of their earlier orders. In most cases, this amounts to deferrals. In a few, there are outright cancellations.

Users no longer need the protection of over-ordering to be sure of getting even a little steel. Consequently, some of the hedge orders are getting axed.

But this isn't a sign that the market is softening materially. Other buyers are often waiting to fill any holes that show up in schedules. It just means that a semblance of order is returning to the steel market.

Sheet and Strip — Demand for sheet products still exceeds supply. For the most part, customers want to place more orders than the mills can take. Automakers are still pressing for added tonnage.

But the frantic pressure of several weeks ago has eased. There is less fuss now when an order misses its delivery date.

Different opinions are beginning to show up as to when the demand for flat-rolled products will ease. In the **East,** one mill foresees no early letup in the demand for sheet. Customers are still on rigid quotas and, the mill says, customers haven't been able to build inventories.

In the same area, another mill expects holes in its sheet schedules before the end of the second quarter. While the holes will be few in number, a return to the "hard sell" is predicted for the third quarter.

A **Pittsburgh** mill "feels" demand for cold-rolled sheets will ease in June, but this will depend largely on auto sales. Meanwhile, in **Detroit,** automakers are showing some concern over the failure of auto sales to reach expected levels. Sales have been running 7 to 9 pct ahead of the year ago rate, but the industry has been anticipating a 15 to 20 pct increase over the 1959 period.

Enameling — A new base metal for direct application of porcelain enamel finish coats has been announced by Armco Steel Corp. The material is said to be produced from an improved grade of enameling iron with special processing at the mill. A single finish coat of porcelain enamel can be applied directly to the base metal in one firing operation.

Freedom from fish-scaling or boiling of the porcelain enamel finish is claimed as the most important property of the new sheet metal. The conventional ground coat required for regular enameling grades of iron and steel is eliminated.

Called Univit, the material is expected to find widest use in the appliance industry. Armco has indicated licenses to manufacture this product will be available to other producers.

Bars—Producers are still experiencing heavy demand in the **Midwest.** Automotive forge shops in **Cleveland** are keeping the pressure on mills for delivery. Some are taking partial orders to maintain operations.

Cold-finished bar supplies are tight in **Chicago.** And some material has been brought into the area to ease the pressure. But an easing of the local situation isn't expected for about 60 days.

Tinplate — While mills are still under pressure for delivery, and expect full order books in the second half, demand at **Pittsburgh** is less frantic. With steel supplies assured, smaller users are reviewing the situation. Demand is firm, but more orderly. Before, buyers were trying to get all of the steel they could.

Pipe and Tubing—Mills are running at peak output and this will continue into the second quarter. For example, **Cleveland** distributors are finding it slow going in rebuilding inventories to their normal 30 to 60 day levels because of the steady demand for commercial and residential construction.

Despite reports that customers are being offered prompt delivery for spot lots, a **Pittsburgh** mill says it has no holes in February or March schedules.

PURCHASING AGENT'S CHECKLIST

Upward pressures on prices are strong, but so are pressures to hold the line. (An IRON AGE Special Report.) P. 47

Foundries will spend more than $6.5 billion to modernize and expand. P. 50

Imported pipe is growing threat to domestic producers. P. 52

COMPARISON OF PRICES

(Effective Feb. 2, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Feb. 2 1960	Jan. 26 1960	Jan. 6 1960	Feb. 3 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Feb. 2 1960	Jan. 26 1960	Jan. 6 1960	Feb. 3 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00*	11-12¼	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50	$44.50	$43.50	$47.50
No. 1 steel, Phila. area	41.50	41.50	41.50	39.50
No. 1 steel, Chicago	40.50*	41.50	39.50	44.50
No. 1 bundles, Detroit	41.50*	40.50	38.50	40.50
Low phos., Youngstown	48.50*	49.00	48.50	49.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	51.50
No. 1 mach'y cast, Phila.	54.50	54.50	54.50	56.50
No. 1 mach'y cast, Chicago	61.50*	62.50	60.50	56.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$42.17*	$42.50	$41.50	$43.83
No. 2 bundles	28.17*	28.50	27.83	30.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	30.00
Copper, Lake, Conn.	33.00	33.00	33.00	30.00
Tin, Straits, N. Y.	100.50†	100.375	99.375	101.00
Zinc, East St. Louis	13.00	13.00	12.50	11.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites
Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Mill Pressures Weaken Market

Dual impact of large auto lists and limited mill buying weakened the market.

Industrial lists at Detroit were large, in some cases setting tonnage records.

▪ The market weakened slightly this week.

It faltered under the dual impact of large auto lists and mill resistance to buying. The heavy auto lists, some setting tonnage records, were generally in strong demand. In some markets, they did much to fill mill demands quickly. In others, they had an adverse effect on prices.

Added to this are continued efforts by the mills to stagger their purchases and limit buys.

Midwest Drop—At Chicago, mill pressure on prices pushed down the whole list $1 a ton. Dealers resisted mill efforts to buy even below the new level. At Pittsburgh, mills are generally able to get needed scrap without upsetting the market.

Along the East Coast, the market lacks zip. Export is still helping support domestic price levels. No. 1 heavy melting at Philadelphia remained unchanged, although several other grades fell.

Reflecting the changes at Chicago, the IRON AGE No. 1 Heavy Melting Composite dropped slightly to $42.17.

Pittsburgh — The market shows little change after a peak period of mill demand for scrap. There has been no big price surge despite the fact local and Ohio River mills bought an estimated 350,000 tons during the last 60 days. Most of this tonnage has come from industrial and railroad lists and premium stockpiles in dealer yards. Only about 150,000 tons is accounted for by general orders. Mills have been able to meet heavy demands without disturbing the market.

Chicago—Mill pressure forced a price rollback of $1 a ton down the list. Strong buying levels of last week were offset by mill resistance and an outbreak of labor problems. These slowed scrap movement and brought some market uncertainty. Mill offers to buy at $2 a ton below listed prices failed, however, to move scrap.

Philadelphia — The domestic market lacks steam at the moment. Export continues to act as a prop under heavy melting grades. But there's an easing in prices for some other grades. The dual price structure for No. 1 dealer bundles no longer exists. The price has firmed at the lower level.

New York—Steelmaking grades fell $2 a ton in this market. New top price for No. 1 heavy melting was $34. Dealers suggested the move reflected the large auto lists. Pipe foundries have reduced their buying prices for mixed yard cast by $1.

Detroit — Large industrial lists closed at higher prices, up $1 to $2 from last week's levels. Some of the individual lists set an all-time high for tonnage. Estimates placed the amount of bundles offered at over 50,000 tons. All the tonnage was quickly snapped up. As the lists closed, dealers began shooting tonnage into the market. Trading was the most active in some time.

Cleveland—With mills concentrating mostly on factory lists, the dealer market is off $1.50 a ton in Cleveland and the Valley. Heavier than normal auto tonnage lists sold in the area at levels about even with those a month ago. This was apparently enough to fill current mill needs.

St. Louis—Rapid buying of large auto scrap tonnages swept away some of the gloom which had been hanging over the market. Prices generally held unchanged. Local mills are still buying only what scrap they need. The flow of scrap is not brisk enough to bring any increase in prices.

Cincinnati—Prices rose on prime grades as local mills tried to keep scrap in the area. At prices $2 over a month ago, local factory bundles also stayed in the area. Local yards expect to make steady shipments all through the month.

Birmingham — Renewed buying by a large local electric furnace pushed up electric furnace grades $1 a ton. Otherwise, prices are generally unchanged. Movement of limited quantities of foundry scrap continues slow.

Buffalo—Sales of No. 1 and No. 2 grades at prevailing prices confirmed present price level. Dealers labeled these orders as only for token tonnages. Price changes are not expected until the Great Lakes shipping season begins.

Boston—Market continues lackluster. Activity is limited to a little export and a little domestic-tonnage. Prices are holding at existing levels.

West Coast—Prices are weak. Some dealers wouldn't be surprised to see lower prices soon. Up and down the coast, the scrap market is dull. Exporting to Japan is the only bright spot.

Houston — Entry of an East Texas mill buyer into the market, however, created a stir. Prices were greater than local prices because of the distance involved. Local prices remain unchanged.

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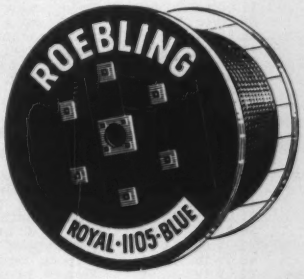

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SCRAP PRICES *(Effective Feb. 2, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs plate	52.00 to 53.00
Heavy turnings	38.00 to 39.00
No. 1 RR hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	60.00 to 61.00
Rails 2 ft and under	64.00 to 65.00
RR specialties	57.00 to 58.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. forge crops	55.00 to 56.00
Low phos. punch'gs plate, ¾ in. and heavier	52.00 to 53.00
Low phos. 2 ft and under	50.00 to 51.00
No. 1 RR hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	56.00 to 57.00
Rerolling rails	63.00 to 64.00
Rails 2 ft and under	62.00 to 63.00
Angles and splice bars	55.00 to 56.00
RR steel car axles	60.00 to 61.00
RR couplers and knuckles	52.00 to 53.00
No. 1 machinery cast.	61.00 to 62.00
Cupola cast.	54.00 to 55.00
Cast iron wheels	49.00 to 50.00
Malleable	63.00 to 64.00
Stove plate	51.00 to 52.00
Steel car wheels	52.00 to 53.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	22.00 to 23.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	46.00 to 47.00
Low phos. 2 ft punch'gs	48.00 to 49.00
Elec. furnace bundles	47.00 to 48.00
Heavy turnings	34.00 to 35.00
RR specialties	50.00 to 51.00
Rails, 18 in. and under	67.00 to 68.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	46.00 to 47.00
Cast iron car wheels	50.00 to 51.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	54.00 to 55.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	21.00 to 22.00
Low phos. 18 in. and under	49.00 to 50.00
Rails, random length	54.00 to 55.00
Rails, 18 in. and under	62.00 to 63.00
No. 1 cupola cast.	49.00 to 50.00
Hvy. breakable cast.	42.00 to 43.00
Drop broken cast.	57.00 to 58.00

Youngstown

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	37.50 to 38.50
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	20.50 to 21.50
Shoveling turnings	25.50 to 26.50
Low phos. plate	48.00 to 49.00

Cleveland

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	42.50 to 43.50
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	23.50 to 24.50
No. 1 busheling	42.50 to 43.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Cut structural & plates, 2 ft & under	49.00 to 50.00
Drop forge flashings	42.50 to 43.50
Low phos. punch'gs plate	43.50 to 44.50
Foundry steel, 2 ft & under	41.00 to 42.00
No. 1 RR hvy. melting	45.50 to 46.50
Rails 2 ft and under	62.00 to 63.00
Rails 18 in. and under	63.00 to 64.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	59.00 to 60.00
No. 1 machinery cast.	59.00 to 60.00
Stove plate	51.00 to 52.00
Malleable	62.00 to 63.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	100.00 to 110.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 busheling	36.00 to 37.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	20.00 to 21.00
Low phos. plate	44.00 to 45.00
Structurals and plate, 2 ft and under	44.00 to 45.00
Scrap rails, random lgth.	42.00 to 43.00
Rails 2 ft and under	52.00 to 53.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	26.00 to 27.00
No. 1 RR hvy. melting	44.00 to 45.00
Rails, random lengths	52.00 to 53.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	50.00 to 51.00
RR specialties	49.00 to 50.00
Cupola cast.	52.00 to 53.00
Heavy breakable cast.	45.00 to 46.00
Stove plate	44.00 to 45.00
Cast iron car wheels	48.50 to 49.50
Rerolling rails	60.00 to 61.00
Unstripped motor blocks	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	41.00 to 42.00
Elec. furnace, 3 ft & under	39.00 to 40.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	53.00 to 54.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	49.00 to 50.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	22.00 to 23.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	36.00 to 37.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	22.00 to 23.00
No. 1 bushelings	39.00 to 40.00
Drop forge flashings	39.00 to 40.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	20.00 to 21.00
Heavy breakable cast.	40.00 to 41.00
Mixed cupola cast.	47.00 to 48.00
Automotive cast.	52.00 to 53.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	16.50 to 17.50
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	41.00 to 42.00
Mixed cupola cast.	37.50 to 38.50
Heavy breakable cast.	35.50 to 36.50

San Francisco

No. 1 hvy. melting		$40.00
No. 2 hvy. melting		36.00
No. 1 dealer bundles		36.00
No. 2 bundles		22.00
Machine shop turn.	$17.00 to	19.00
Cast iron borings	17.00 to	19.00
No. 1 cupola cast.		46.00

Los Angeles

No. 1 hvy. melting		$41.00
No. 2 hvy. melting	$35.00 to	36.00
No. 1 dealer bundles		36.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	18.00 to	19.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	18.00 to	19.00
Elec. furn. 1 ft and under (foundry)	49.00 to	50.00
No. 1 cupola cast.	47.00 to	48.00

Seattle

No. 1 hvy. melting		$35.00
No. 2 hvy. melting		33.00
No. 2 bundles		22.00
No. 1 cupola cast.		36.00
Mixed yard cast.		36.00

Hamilton, Ont.

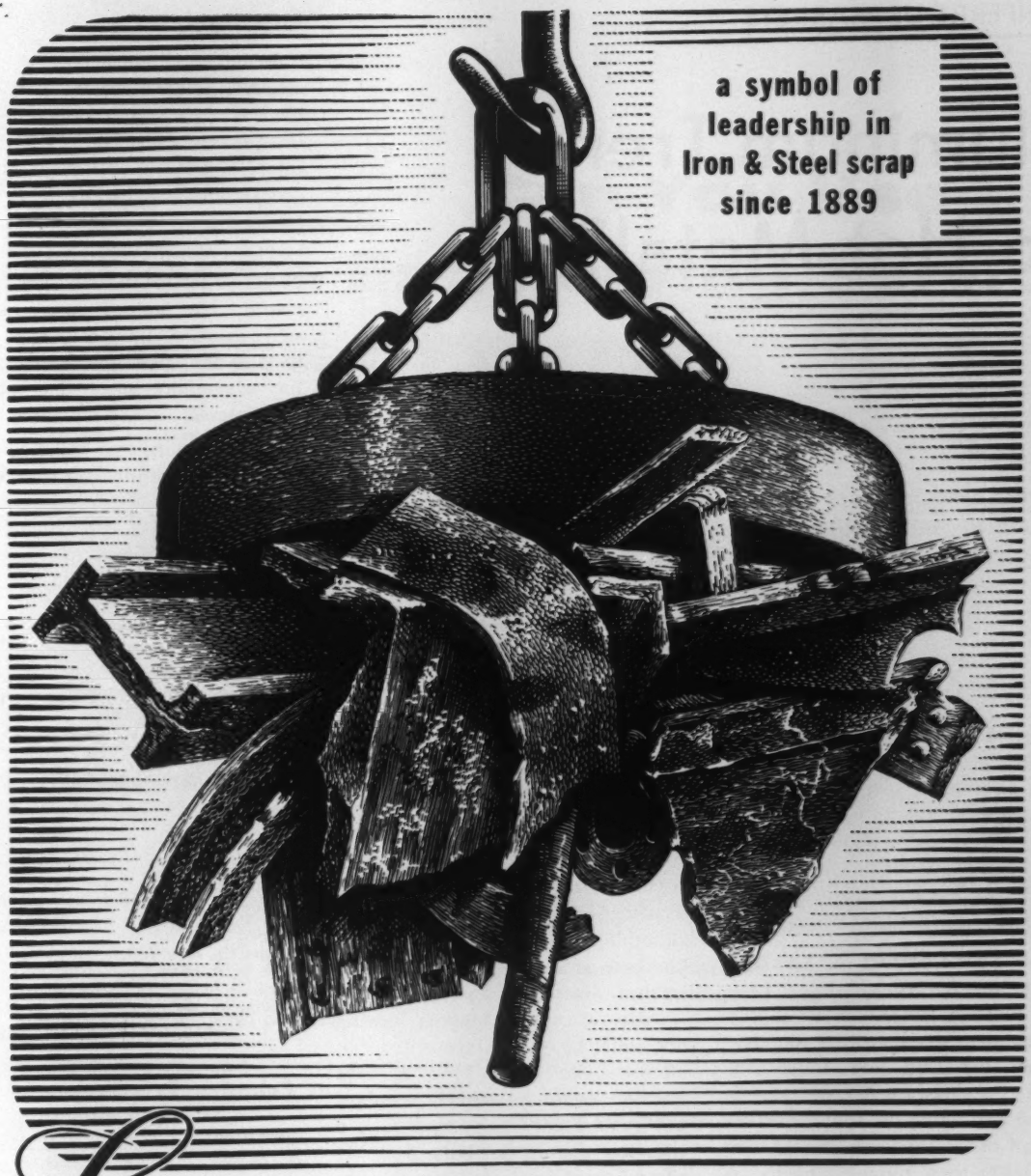
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting		$32.25
No. 2 hvy. melting		28.25
No. 1 dealer bundles		32.25
No. 2 bundles		24.00
Mixed steel scrap		24.25
Bush., new fact., prep'd		32.25
Bush., new fact., unprep'd		26.25
Machine shop turn.		14.00
Short steel turn.		17.00
Mixed bor. and turn.		13.00
Cast scrap	$46.50 to	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting		$39.00
No. 2 hvy. melting		36.00
No. 2 bundles		26.00
Machine shop turn.		16.00
Shoveling turnings		20.00
Cut structural plate 2 ft & under	$47.00 to	48.00
Unstripped motor blocks	34.00 to	35.00
Cupola cast.	42.00 to	43.00
Heavy breakable cast.	33.00 to	34.00



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IMPORT and EXPORT — LIVINGSTON & SOUTHARD, INC., Chrysler Building East, New York, N. Y. • 5950 S. Boyle Avenue, Los Angeles 58, California
Cable Address: FORENTRACO

Aluminum Trend To Hot Metal?

Largest two U. S. aluminum producers are now selling molten metal.

Latest contract, between GM and Alcoa, is particularly significant.

▪ On July 5, a unique General Motors truck will swing out of the Aluminum Co. of America plant at Evansville, Ind., and head northeast.

Destination: Fabricast foundry of General Motors at Bedford, Ind., about 100 miles away.

Cargo: As much molten aluminum as GM and Alcoa engineers figure can be moved safely in the closed crucible vehicles now being designed.

Two-Year Contract — This will be the maiden run under a two-year contract for Alcoa to supply hot metal to the Fabricast foundry. Neither has said how much hot metal Fabricast will take. It is known that while the foundry won't take all of the smelter's 25,000 tons to 30,000 tons annual capacity, it will be by far the biggest customer.

This is not the first sale of molten aluminum. But it may be the most significant. And there may be some repercussions.

It's the Trend—Until now Reynolds Metals Co. has been the only seller of hot metal. Small founders, secondary smelters, and diecasters are opposed. They charged hot metal pricing methods were discriminatory and illegal, before the Yates Committee (subcommittee on aluminum of the House Small Business Committee) late in 1957 and in 1958. Extensive hearings were held, but no final conclusion was reached.

Now, with the country's two largest producers of aluminum committed to hot metal, it has to be classified a trend. A spokesman in Rep. Yates' office said the Congressman was watching the situation carefully. But there seems little chance for new hearings.

This is the first time molten metal will be moved regularly more than a few miles. The Evansville-Bedford run is figured at less than four hours. Alcoa and GM engineers are not likely to have trouble keeping the metal liquid for eight hours.

Other Customers—This opens up possibilities for any large user of aluminum castings within several hundred miles of an aluminum smelter. Small founders fear this.

Also, a captive foundry buying hot metal has more incentive to go after outside work. First, it pays less for aluminum. Under standard hot metal contracts, it must take a specified amount regularly. A diversified line of products takes the ups and downs out of holding furnace and alloying costs.

Fabricast was already pitching for non-auto sales before the news of the molten metal contract with Alcoa was confirmed.

There is some evidence that General Motors is seriously studying the long-range possibilities of molten metal contracts. It is involved in two of the other three hot metal projects: Fabricast at Jones Mill, Ark., and Chevrolet at Massena, N. Y. The other is Ford at Lister Hill, Ala.

Copper

Kennecott Copper Co. compromised to end the strikes at its Utah Div. It may have taken the first steps to avoid this situation in the future—where a strike by a few can shutdown an entire 6000 man operation.

The company gave up the participation part of its No Strike clause. The unions agree not to strike during their contract. But they do not agree to cross the picket line of another union that violates its contract.

"It's discipline that really counts", said a top Kennecott executive. "Union leaders at headquarters can tell the men to work. But if they don't there isn't much you can do."

Tin prices for the week: Jan. 27—100.375; Jan. 28—100.375; Jan. 29—100.25; Feb. 1—100.50; Feb. 2—100.50.*

* Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in JANUARY based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	33.00
Copper, Lake	33.00
Straits Tin, New York	99.85
Zinc, E. St. Louis	12.90
Lead, St. Louis	11.80
Aluminum ingot	28.10

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	35.00	33.00	12/23/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y	12.00	12.50	12/21/59
Magnesium ingot	38.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 140.**

LOOK FOR THE DIAMONDS—SIGN OF FINISHING QUALITY

Can You Use Process Engineering Service Like This?

Ainsworth Precision Castings Co.
Springfield, Tennessee

Complete system for Zinc plating and Iridite—designed, fabricated, installed and serviced by Allied Research to turn out auto window channels, gear shift and directional signal components.

Here's what Allied Research did to give Ainsworth "Turn Key" service:

1. Planned the entire layout and operational details.
2. Recommended and presented complete cost analysis of processes, equipment and supplies necessary . . . and furnished them.
3. Reconditioned existing equipment and integrated it with new equipment to make the installation both economical and efficient.
4. Planned and constructed a complete waste disposal system for treating cyanide wastes.
5. Installed 14-station zinc-IRIDITE automatic, 12-station zinc barrel line, and a still line.
6. Set up procedures for regular qualitative testing of coatings and solutions.
7. Executed an extensive training program for operators.
8. Entire operation completed ahead of schedule even though overall construction was badly delayed by weather . . . production personnel merely turned the key, and started operations.

PROCESS ENGINEERING SERVICE can help you. Whether you require a single piece of equipment or a complete system. Write for complete details. Let us quote on your plans for renovation or new installation . . . call your Allied Field Engineer. He's listed in the yellow pages under "Plating Supplies".

Allied Research Products, Inc.

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MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper, except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bs.	56.17	56.46	55.86	59.48
Mang. Bs.	58.86	.....	52.21	.....
Phos. Bs. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $7.55-$9.50; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.40
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ... $ 1.31
Cobalt, 97-99% (per lb) ... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 33.30 to 42.00
Gold, U. S. Treas., per troy oz. ... $35.00
Indium, 99.9%, dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $211 to $213
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz.. $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.25
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 44.00
- No. 215 ..... 40.75
- No. 245 ..... 36.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 26.25-26.50
- 0.60 copper max. 26.00-26.25

Piston alloys (No. 132 type).. 28.00-29.00
No. 12 alum. (No. 2 grade)... 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)... 26.00-26.25
AXS-679 (1 pct zinc) 25.00-26.00

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22½	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	30
No. 2 copper wire	26¼
Light copper	24
*Refinery brass	24½
Copper bearing material	23½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27½
No. 2 copper wire	26
Light copper	24
No. 1 composition	22½
No. 1 comp. turnings	22
Hvy. yellow brass solids	16¾
Brass pipe	16¼
Radiators	18
Aluminum	
Mixed old cast.	14½—15½
Mixed new clips	17 —17½
Mixed turnings, dry	15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	26¼—26¾
No. 2 copper wire	23½—24
Light copper	22 —22½
Auto radiators (unsweated)	14¾—15¼
No. 1 composition	19 —19½
No. 1 composition turnings	17½—18
Cocks and faucets	15¼—15½
Clean heavy yellow brass	13¼—13¾
Brass pipe	15¼—15½
New soft brass clippings	15½—15¾
No. 1 brass rod turnings	12¾—13

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcase	11¼—11¾
1100 (2s) aluminum clippings	15 —15½
Old sheet and utensils	11¼—11¾
Borings and turnings	7 — 7½
Industrial castings	11¼—11¾
2020 (24S) clippings	12½—13

Zinc

New zinc clippings	7 — 7¼
Old zinc	4½— 5
Zinc routings	3¼— 3½
Old die cast scrap	2¾— 3

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	28-29
Clean Monel turnings	20-23
Old sheet Monel	24-26
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed	15

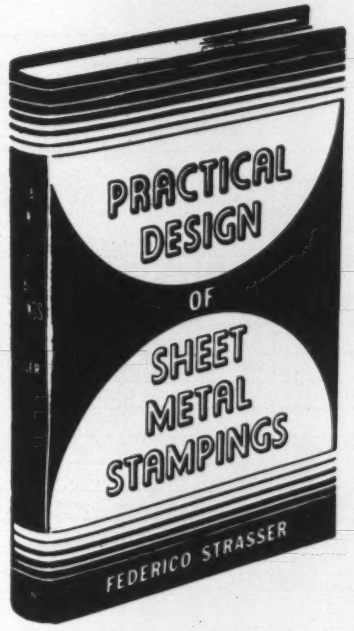
Lead

Soft scrap lead	3 — 3¼
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	75 —76
No. 1 pewter	55 —56
Auto babbitt	39 —40
Mixed common babbitt	9¾—10¼
Solder joints	13¼—13¾
Siphon tops	41
Small foundry type	9¾—10¼
Monotype	9¾—10¼
Lino. and stereotype	8¾— 9
Electrotype	7½— 7¾
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

(Effective Feb. 2, 1960)



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IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1; C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Feb. 2, 1960)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Feb. 2, 1960)

**7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. **Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.**

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr'a. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.675 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,13, Y1*	5.675 *U1,13, Y1*	7.65 *R3,J3*	6.725 *U1,13, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,13, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,13*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Feb. 2, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING — **Base discounts (net) f.o.b. mills. Base price about $200 per net ton.**

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50								
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50								
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Fontana *K1*	+6.25		+2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50								
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective Feb. 2, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*****	173	190	177	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2*****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	187	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.60	10.15
Rankin, Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

(Effective Feb. 2, 1960)

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	48.25
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

	Full case or Keg price
Nuts, Hex, HP reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws *Discount (Packages)*

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Plain Finish		
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. 25,000-and over	60	..
5/16 to ½" diam. incl. 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk		
⅜" diam. & smaller 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	.5.10	9.90	10.10	10.16	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.87	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.80	10.50	11.40	11.30	10.25	10.40	9.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.16	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69[1]	9.89	11.09	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.65	9.65	.....	10.85	9.65	9.35	8.90	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	8.74	10.27	11.37	9.05	9.44	9.46	9.54	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.45	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.99	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.87	10.73	11.48	10.53	8.79	9.54	8.96	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	8.95	9.46	10.69	10.47	8.75	9.48	8.85	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—½" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—13/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 10¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Feb. 2, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS.

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3,* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet. *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective Feb. 2, 1960)

C ELECTRIC FURNACE STEEL CASTINGS

are engineered to *YOUR* specific requirements

"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

CARBON, ALLOY OR STAINLESS STEEL SAND OR SHELL MOULDED

The technical experience and knowledge of our engineering staff are at your service. Write, phone, or call.

CRUCIBLE STEEL CASTING CO.
LANSDOWNE 1, PENNA.

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2303G North 11th St. • St. Louis 6, Mo.

CUT SCRAPER TIME
END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

THE DYKEM CO., 2303G NORTH 11TH ST., ST. LOUIS 6, MO.

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:	
Carloads, bulk	13.70
Ton lots packed in bags	16.10

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	10 lb, pig	35 lb, down
16 to 19%	3% max. ...	$98.00	$96.00
19 to 21%	3% max. ...	100.00	98.00
21 to 23%	3% max. ...	102.50	100.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk	34.25
Ton lots, palletized	36.25
250 to 1999 lb	39.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk	11.60
Ton lots, packed	13.25
Carloads, bulk, delivered, per lb of briquet	14.00
Briquets, packed pallets, 2000 lb up to carloads	16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
		90% Si....	20.00

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Feb. 2, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti .....

	$1.50
Less ton lots	$1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. .....

	$1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, fo.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20

F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

ELECTRICAL POWER EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New Elliott	Enc. S.F.	475	320
1	3900	New G.E.	Enc. S.F.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
2	2700	G.E.	MCF	415	280
1	2250	New Elliott	Enc. S.F.	600	200/300
1	2250	New G.E.	Enc. S.F.	600	200/300
1	2200	G.E.	MCF	600	400/500
2	2000	G.E.	MCF	350	230/350
2	1750	G.E.	MCF	250	175/350
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D8	600	600/900
2	940	S.S.	Enc. F.V.	600	800/1000
2	800	G.E.	MCF	250	400/750
2	765	Allis Ch.	MHC	550	1012/1350
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
4	400	GM.	D8	250	300/900
2	400	G.E.	CY-275	300	1000/1500
2	325	Allis Ch.	MHC	250	450/900
1	300	Cr. Wh.	H-102 B.B.	230	1200
1	200	Rel.B.B.	T-664-D.P.	240	850
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.B.B.	CDP-115	230	1750
1	120	G.E.B.B.	TLC-50	250	1950/5000
1	100	Whse.	SK-180	230	450/1100
1	100	G.E.	CDP-145	230	1750
1	80	Whse.	SK-123.9	240	2000/4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850

MERCURY ARC RECTIFIERS

3—150KW. G.E., Sealed Tube Ignitron Unit Substation load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.
2—150 KW. G.E., Ignitron, 243 V. D.C.—230 V. A.C. air cooler transformers with controls.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1700	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	500	G.E.	900	125/250	440
1	500	G.E.	900	250	2300/4600
1	500	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	250	440
1	150	G.E.	1200	125	440
	140	Cr.Wh.	690	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	81160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
3	1000	G.E.	OA/FA	1	13800 x 230/460
3	833	A.C.	OISC	1	4800/2400 x 480
3	833	A.C.	OISC	1	10175/13475x 2300/4000
2	750	G.E.	Pyranel	1	4800x85/55-255/165
3	500	Mal.	C	1	6600/11430Yx480
3	500	Kuhl	OISC	1	13200 x 6600
3	150	G.E.	OISC	1	33000x2300/4000Y
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS

230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	23	G.E.	650	MDS-408
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	SW-50 Comp.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

RE-NU-BILT By

BELYEA COMPANY, INC.

47 Howell St. Jersey City 6, N. J.

Tel. OLdfield 3-3334

'60 May Be Good Year For N. Y. Dealers

Used machine dealers in the New York area feel that 1960 may be a good sales year after all.

Since the steel strike settlement, optimism for better sales has been growing.

▪ New York area used and rebuilt machinery dealers have decided that 1960 may turn out to be a pretty good year after all. A slow fourth quarter in 1959 had worried some about prospects, but business is now showing signs of an upturn.

Steel strike settlement is unquestionably the major factor. Many prospects were reluctant to buy until steel supply prospects were clarified. Now, they can be reasonably sure of having something to put on the machines when they arrive.

Money Available—Budget appropriations for expansion and modernization also have been heartening. Several deals which have been hanging fire until spending was approved have now come through. And machinery buyers generally are optimistic about business prospects, especially in the first half.

Small appliance makers, heavily represented in this area, are particularly cheerful. They now feel they will have enough steel to meet spring production schedules. Construction, vital in New York, has zoomed. Contract awards nationally are at a peak. Construction machinery, press brakes, bending rolls and presses are in increased demand as fabricators start scheduling work against the spring building spurt. Probable upward revision of housing starts estimates is of considerable importance in this section of the trade.

Late Model Demand—Tool room equipment is also perking up. So are presses in the medium and heavy capacities. Lightweights are hard to move, and not only in presses. "To sell today, a tool must be heavy duty and high production," comments one dealer. And they must also be late models; older tools find no buyers.

Inquiries continue to rise, always a good sign. Dealers are hopeful that the time lag between inquiries and sales will narrow. But they are gratified to see long-standing inquiries finally show up on the cash register.

Possible Price Hike—Tight money continues to be a hindrance, but no one wants to call it more than that. Most buyers are prepared to pay going prices. They either have the cash or know where it can be found. Machinery prices are firm. But neither buyers nor sellers find them overpriced. "There's very little price haggling today," reports one dealer.

However, possible tightness in some lines may raise prices. Cranes are a want-list item, and higher price tags may be necessary to draw them out. Demand for cranes is particularly heavy from fabricators for the construction industry. These shops find themselves handling heavier sections and need more lifting muscle.

ROLLING MILLS—STEEL WORKS EQUIPMENT

1—32" & 20" x 110" PLATE MILL, 3-high.
1—28" x 40" HOT STRIP MILL, 2-high reversing, with 2500 HP D.C., motor generator, etc.
1—25" & 42" x 60" HOT STRIP MILL, 4-high.
1—24" x 36" 2-HIGH MILL driven by 400 HP motor, 4600/3/60.
1—22" x 36" 2-HIGH MILL driven by 600 HP motor, 4660/3/60.
1—2½" & 8" x 8" COLD STRIP MILL, 4-high.
1—8" x 10" COLD MILL including uncoiler.
2—28" 3-HIGH ROLL STANDS.
1—New 16" BAR MILL, one 3-high rail stand, pinion stand.
1—INDUCTION WELD TUBE MILL, 2" to 8" dia., new 1954.
1—12" MERCHANT BAR MILL with 18" roughing mill and heating furnace.
1—9" BAR MILL, 3-high.
1—34" x 192" ROLL GRINDER.
2—65-TON ELECTRIC MELTING FURNACES, TOP CHARGE, with all electrical and mechanical equipment, including 15,000 KVA and 13,333 KVA transformers.
1—OPEN SIDE BAR SHEAR, Williams & White No. 14½, for 1¾" round.
1—SHEET POLISHING MACHINE, Capacity 48" x 144"
1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 36" dia. rolls.
1—OPEN HEARTH CHARGING MACHINE, 5 ton capacity 11' track gauge.
1—MAGNETIC SEPARATOR double pulley, Stearns.
2—FLYING SHEAR LINES for tinplate sizes.
1—SIDE TRIMMER, Streine, maximum width 48" makes 2 cuts 316" mild steel.
1—SCRAP BALLER, max. size scrap roll 24" O.D. x 24" long.
1—HALLDEN STRAIGHTENING and cutting-off machine, capacity .562" brass rod.
1—POINTER for tube 2" O.D. x ¼" wall maximum.
3—CRANE TONGS for coils, automatic, 30,000 lbs. capacity.
1—1200 HP GEAR DRIVE, 295 to 39 RPM.
1—1200 HP GEAR DRIVE, 353 to 94.5 RPM 3.73 to 1 ratio.
1—3500 HP MOTOR, 11000/6000 volts, 3 phase, 60 cycle, 514 RPM, synchronous, never used.

FRANK B. FOSTER, INC. 2220 Oliver Building, Pittsburgh 22, Pa.
Cable: "Foster, Pittsburgh" Telephone Atlantic 1-2780

PUMPS FOR SALE

1—ALLIS-CHALMERS 3 or 4 stage, 4" inlet, 3" outlet, 500# pressure, 150 GPM, 75 hp motor.
1—INGERSOLL RAND CAMERON Size 4HMT-4, 450 GPM pump, 539' head, 1200# water hydro test, 4-stage, 115' per stage, G.E. 100 HP.
1—INGERSOLL RAND CAMERON Size RT-4, four stage suction, 450 GPM pump, 3560 RPM, 1100' head, 1200# Hydro Test. Reliance 200 HP.

AAA Machinery & Equipment Company
10900 Cedar Avenue — Cleveland, Ohio
SWEETBRIAR 1-3900

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

SLIP RING MOTORS
3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	3500	G.E.	Mill	6600/4160	240
1	2500	G.E.	Mill	2300	296
1	1800	Whse.	Mill	2300	252
1	1500	G.E.	Mill	6900/4160	444
1	1200	G.E.	Mill	2200	295
1	1000	Whse.	C.W.	2300	441
1	500	Ideal	S-4-20	4800	708
1	500	Al Chal.	ANY	2200	595
1	500	Al Chal.	ANY	2200	293
1	400	Al Chal.	ANY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	I-M	2200	1180
1	350	G.E.	MT-412	2200	450
1	300	Whse.	CW-1012	2200	704
1	250	Whse.	CW	4160/2400	710
1	250	G.E.	MT-414	2200	300

SYNCHRONOUS MOTORS
3 Phase—60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	6000	G.E.	Unity	2300	90
1	1750	G.E.	Unity	2200	3600
1	1500	Whse.	80%	2300	514
2 (new)	1400	Whse.	80%	4160	450
1	900	G.E.	Unity	460	300
1	700	El.Mchy.	Unity	440	200
1	500	El.Mchy.	80%	2300/440	720
1	450	Whse.	Unity	2200	128
1	300	G.E.	80%	2200/440	600

TRANSFORMERS
Outdoor—Oil Cooled—60 Cycle

Qu.	KVA	Make	Ph.	Prim.	Sec.
1	300	Whse.	3	11500	440
9	333	Amer.	1	2400/4160	120/240
1	450	Whse.	3	6900/11930	460
3	833	Al.Chal.	1	13200/11000	2300/4000
3	1000	Wagner	1	36000	2300/4330
6	1500	Whse.	1	24000	480
2	3000	G.E.	3	13800	480

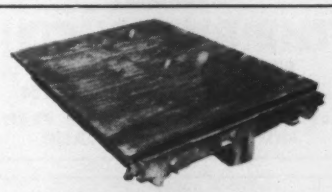
We have in stock a great many modern Outdoor Magnetic Primary Breakers and all types and ratings in Air and Oil Breakers for indoor use.

T. B. MAC CABE COMPANY
4302 Clarissa St., Philadelphia 40, Penna.
Cable Address "Macsteel" Philadelphia, Pa. Phone Davenport 4-8300

COX MACHINES

Pipe Cutting and Threading
Tube Cutoff
New Machines Only

The Cox and Sons Company
Bridgeton, N. J.
Catalogue upon Request



SURFACE PLATES—8' x 12'

Cast Iron, Recently Machined, Perfect Condition. Suitable for Surface or Layout Plates. Reasonable.

WARREN IRON & METAL CO.
12455 Greenfield Road, Detroit
Ve. 5-4660

FOR SALE

We can deliver immediately the following items in SAE 52100 rounds—all bearing quality—considerably under mill price—Quality guaranteed as to analysis and condition.

Size	Spec.	Weight
.155"/.159"	C.D.	6000#
.173"/.177"	C.D.	8800#
.176"/.180"	C.D.	9300#
.231"/.235"	C.D.	4000#
.234"/.238"	C.D.	16500#
.257"	C.D.C.G.	5500#
.629"/.643"	HR x Coil	8800#
.715"/.731"	HR x Coil	1200#
.747"/.754"	C.D.	22500#
.758"/.762"	C.D.	500#
.812"/.819"	C.D.	24000#
2⅛"	HR	1000#

We also carry many sizes in SAE 52100—bearing quality tubing—Write for stock list.

GLOBE TRADING CO.
1815 Franklin Street Detroit 7, Mich.
Woodward 1-8277

eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

BROACHING MACHINES
12x72" Thompson Automatic Flat Broach, m.d.
10 ton, 84" stroke LaPointe Single Ram Vertical Surface Broach, m.d., late
Type SBD-42-6 American Vertical Hy. Dup. Broach
Type SBD-48-15 American Vertical Dup. Ram Surface Hydraulic Broach

RADIAL DRILLS
2'-9" col. Fosdick Plain, m.d.
3'-9" col. Cincinnati-Bickford, m.d.
4'-11" col. Canedy-Otto-Cincinnati, m.d.
4'-13" col. Fosdick, 1944
6'-17" col. American Triple Purpose, m.d.
7'-16" col. American Triple Purpose, m.d.
8'-17" col. Dreses, gear box m.d.
Baush Radial Drilling & Tapping Machine, m.d.

BALL BEARING DRILLS
No. ½ Avey MA8, m.d.
No. 2 Avey, m.d.
No. 2LMS Leland & Gifford, m.d., H.S.
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No. 4BM Fosdick, single spindle H.S., m.d.
No. 4MS Leland & Gifford H.S., 4 speed A.C., m.d. to spindle
1 spindle No. 2MA6 Avey H.S. Type B, m.d., 7½" overhang, 1943
2 spindle Atlas Bench Type, 1942
2 spindle Allen, belted m.d., 8" overhang
2 spindle No. 2 Avey H.S., belted m.d.
2 spindle No. 2BMA, No. 1 Avey Production Type, m.d.
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2 spindle No. 2 Leland & Gifford H.S., 8" overhang, m.d.
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3 spindle No. 2B-8" Edlund, m.d., H.S.
3 spindle No. 2MA6 Avey, H.S., m.d.
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4 spindle Leland-Gifford, m.d. on each spindle
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4 spindle Demco H.S., individual m.d.
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EQUIPMENT AND MATERIALS WANTED

This section appears weekly and carries announcements of metalworking materials or used machinery and equipment wanted.

SURPLUS STEEL
NEW *WANTED* USED
Structurals, Plate, Pipe and Tubing
Consumers Steel & Supply Co.
P. O. Box 270, RACINE, WISCONSIN

WANTED SURPLUS STEEL
WALLACK BROTHERS
7400 S. Damen Ave. Chicago 36, Illinois
GROVEHILL 6-7474

PRESSES WANTED
One press or entire stamping or forging plant. Write or phone in confidence.
Wender Presses Inc. TRinity 2-1270
1959 Clay Ave., Detroit 11, Mich.

WANTED
BRIDGE CRANES
ARNOLD HUGHES COMPANY
2765 PENOBSCOT BLDG. DETROIT, MICH.
WOodward 1-1894

LARGEST BUYERS
in any quantities
OF SURPLUS—NEW & USED
Structurals—All Types of Steel
Pipe—Tubing—Tanks—Boilers
CALUMET IRON & SUPPLY CO.
175 W. Chicago Ave., East Chicago, Ind.

WEISS STEEL CO. INC.
600 WEST JACKSON BLVD.
CHICAGO 6, ILLINOIS
Buyers of Surplus Steel Inventories
39 Years of Steel Service

DRAW BENCHES WANTED
Two 10,000 lb. to 20,000 lb. shape draw benches for non ferrous use. Process length to 45 feet. Chain operated with electrification. Please give full description with reply.
General Ore & Chemical Corp.
417 So. Hill Street, Los Angeles 13, California

WANTED TO PURCHASE
Metalworking or fabricating plant
REPLIES CONFIDENTIAL
Mr. W. B. WEISS, *President*
WEISS STEEL CO., INC.
600 W. Jackson Blvd., Chicago 6, Ill.

Results

from pilot installation sell Youngstown Sheet and Tube complete 40-furnace Lee Wilson single stack annealing system

Two years ago Youngstown Sheet and Tube installed a pilot single stack annealing operation consisting of six furnaces and 18 bases. Today, after carefully compiling quality-economy comparison records, they have on order a complete Lee Wilson single stack annealing installation of 40 furnaces and 120 bases.

Outstanding results . . . that's what has made the Lee Wilson single stack furnace the most popular method of annealing wherever steel is made.

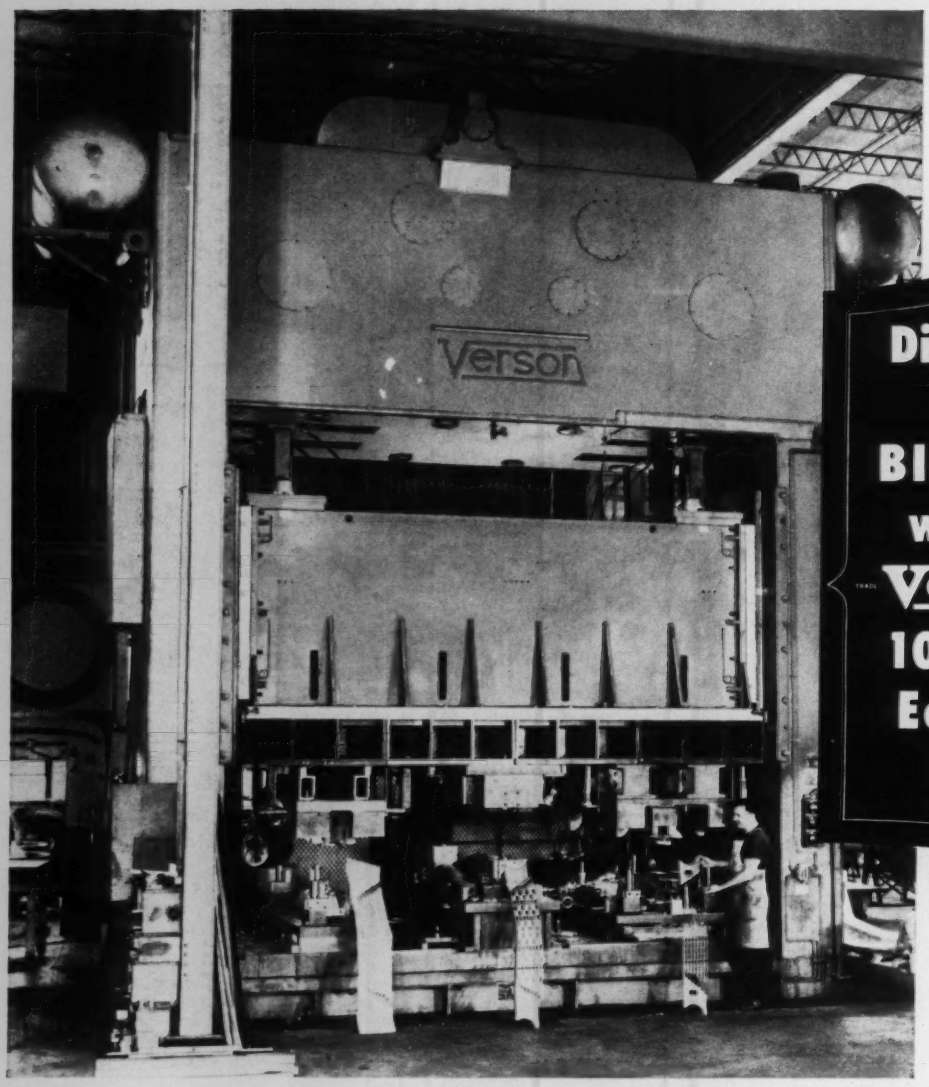
At Youngstown Sheet and Tube much of the comparison was made on 100 percent drawing quality steel where uniformity of anneal is an absolute necessity.

For uniformity and quality—for speed and flexibility—for economy under any operating condition—nothing beats the Lee Wilson single stack annealing furnace. That's why over 600 of them are in use today all over the world!

Lee Wilson

HIGH PRODUCTION ANNEALING SYSTEMS

MAKE THE BEST METALS BETTER



Die Tryout on a BIG SCALE with this Verson 1000 TON Eccentric Press

Efficient Tool and Die Company, Cleveland, Ohio, has big problems . . . big in the sense of physical size. As die makers for the automotive, appliance, and other industries which require large tooling, they are called upon to make and try out some huge dies. They solved the problem with the big 1000 ton Verson Eccentric Press illustrated above.

The press measures 180″ between housings. Stroke of the slide is 24″, and it operates at 8 strokes per minute. The press is equipped with a Verson die cushion in the bed to permit drawing operations to be performed. The huge press weighs over 350,000 pounds.

When photographed, three sets of dies for automobile grills were being tested. While these dies are used singly in production, the large size of the press permitted simultaneous testing.

Whether your requirements are die tryout or full scale production, you'll find that Verson can provide the presses you need to make your operations more efficient. As a big plus, you get all the advantages of Verson know how and experience in the press working of metals. It can make a big difference in your profits. It's easy to put the Verson team to work for you. Just contact your Verson Representative. Or write direct.

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